



SEQUENCE LISTING

<110> Sherman, David
Liu, Hung-Wen
Xue, Yongquan
Zhao, Lishan
Regents of the University of Minnesota, et al.

<120> Promoter for Methymycin and Pikromycin

<130> 600.536US1

<140> 09/988,384

<141> 2001-11-19

<160> 62

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 15872

<212> DNA

<213> *Streptomyces venezuelae*

<400> 1

| | | | | | | |
|-------------|-------------|-------------|-------------|-------------|------------|------|
| ttaattaagg | aggaccatca | tgaacgaggg | catcgccgtc | gtcggcatgt | cctgccgcct | 60 |
| gccgaaggcc | tcgaacccgg | ccgccttctg | ggagctgctg | cggaacgggg | agagcgccgt | 120 |
| caccgacgtg | ccctccggcc | ggtggacgtc | ggtgctcggg | ggagcggacg | ccgaggagcc | 180 |
| ggcggagtc | ggtgtccgcc | ggggcggctt | cctcgactcc | ctcgacctct | tcgacgcggc | 240 |
| cttcttcgga | atctcgcccc | gtgaggccgc | cgccatggac | ccgcagcagc | gactggtcct | 300 |
| cgaactcgcc | tgggaggcgc | tggaggacgc | cggaatcgtc | cccggcaccc | tcgccggaag | 360 |
| ccgcaccgcc | gtcttcgtcg | gcaccctgcy | ggacgactac | acgagcctcc | tctaccagca | 420 |
| cggcgagcag | gccatcaccc | agcacacccat | ggcgggcgtg | aaccggggcg | tcatcgccaa | 480 |
| ccgcgtctcg | taccacctcg | gcctgcaggg | cccagagcctc | accgtcgacg | ccgcgcagtc | 540 |
| gtcctcgctc | gtcgccgtgc | acctggcctg | cgagtccctg | cgcgccgggg | agtccacgac | 600 |
| ggcgctcgtc | gccggcggtga | acctcaacat | cctcgcgag | agcgccgtga | cggaggagcg | 660 |
| cttcgggtgga | ctctccccgg | acggcacccg | ctacaccttc | gacgcgcggg | ccaacggatt | 720 |
| cgtccggggc | gagggcgggc | gagtcgtcgt | actcaagccg | ctctcccgcg | ccctcgccga | 780 |
| cggcgaccgt | gtccacggcg | tcatccgcgc | cagcgccgtc | aacaacgacg | gagccacccc | 840 |
| gggtctcacc | gtgcccagca | gggccgcca | ggagaagggtg | ctgcgcgagg | cgtaccggaa | 900 |
| ggcggccctg | gacccgtccg | ccgtccagta | cgtcgaactc | cacggcaccg | gaacccccgt | 960 |
| cggcgacccc | atcgaggccg | ccgcgctcgg | cgccgtcctc | ggctcggcgc | gccccgcgga | 1020 |
| cgaacccctg | ctcgtcggct | cggccaaagac | gaacgtcggg | cacctcgaag | gcgccgcggg | 1080 |
| catcgtcggc | ctcatcaaga | cgctcctcgc | gctcggccgg | cgccggatcc | cggcgagcct | 1140 |
| caacttcctg | acgccccacc | cggacatccc | ctcgacacc | ctcgggctcg | acgtgcccga | 1200 |
| cggcctcgcg | gagtgggccg | acccggaccg | cgaactcctc | gccggcgtca | gctcgttcgg | 1260 |
| catgggcggc | accaacgccc | acgtcgtcct | cagcgaaggc | cccggcccagg | gcggcgagca | 1320 |
| gcccggcatc | gatgaggaga | ccccgctcga | cagcggggcc | gcaactgccct | tcgtcgtcac | 1380 |
| cggccgcggc | ggcgaggccc | tgcgcgcca | ggcccggcgc | ctgcacgagg | ccgtcgaagc | 1440 |
| ggacccggag | ctcgcgcccc | ccgcactcgc | ccggtcgctg | gtcaccaccc | gtacggtctt | 1500 |
| cacgcaccgg | tgggtcgctc | tcgccccgga | ccgcgcccgc | ctcctcgacg | gcctcggcgc | 1560 |
| cctcgccgcc | gggacgcccc | cgccccggct | ggtcaccggc | acccccgccc | ccgggcgcct | 1620 |
| cgcgctcctg | ttcagcgccc | aggggtgcca | acgtacgggc | atgggcatgg | agttgtacgc | 1680 |
| cgcccccccc | gccttcgcga | cggccttcga | cgcgctcgcc | gccgaactgg | acccccctct | 1740 |
| cgaccggccc | ctcgccgaac | tcgtcgcggc | gggcgacacc | ctcgaccgca | ccgtccacac | 1800 |
| acagcccgcg | ctcttcgccc | tggaggctgc | cctccaccgc | ctcgtcgagt | cctggggcgt | 1860 |
| cacgcccagc | ctgctcgccc | gccactccgt | cggcgagatc | agcgccgccc | acgtcgccgg | 1920 |
| ggtcctgtcg | ctgcgcgacg | ccgcccgcct | cgtcgcggcg | cgcggccgcc | tcatgcaggc | 1980 |
| gctccccgag | ggcggcgcca | tggtcgcggg | cgaggcgagc | gaggaggaag | tgcttcgcga | 2040 |
| cctcgcgggg | cgcgagcggg | agctctccct | cgcggccgtg | aacggccccc | gcgcggtcgt | 2100 |
| cctgcggggc | gccgagcgcg | ccgtcctcga | cgtcgcccag | ctgctgcgcg | aacagggccg | 2160 |
| ccggacgaag | cgggtcagcg | tctcgcacgc | cttcactcgc | ccgctcatgg | agccgatgct | 2220 |

| | | | | | | |
|-------------|-------------|------------|-------------|-------------|-------------|------|
| cgacgacttc | cgccgggtcg | tcgaagagct | ggacttccag | gagccccgcg | tcgacgtcgt | 2280 |
| gtccacgggtg | acggggcctgc | ctgtcacagc | gggccaatgg | accgatcccc | agtactgggt | 2340 |
| ggaccaggtc | cgaggccccg | tacgttccct | cgacgccgta | cgcacccttg | aggaatcggg | 2400 |
| cgccgacacc | ttcctggagc | tcggtccccg | cggggtctgc | tccgcgatgg | cggcggactc | 2460 |
| cgtacgcgac | caggaggccg | ccacggcggt | ctccgccctg | cgcaagggcc | gcccggagcc | 2520 |
| ccagtgcgtg | ctcgccgcac | tcaccaccgt | cttcgtccgg | ggccacgacg | tcgactggac | 2580 |
| cgccgcgcac | gggagcaccg | gcacggtcag | ggtgccccctg | ccgacctacg | ccttccagcg | 2640 |
| cgaacgccac | tggttcgacg | gcgcgcgcgc | aacggcggcg | ccgctcacgg | cgggccgatc | 2700 |
| gggcaccggt | gcgggcaccg | gcccggccgc | gggtgtgacg | tcgggcgagg | gcgagggcga | 2760 |
| gggcgagggc | gcgggtgcgg | gtggcggtga | tcggccggct | cgccacgaga | cgaccgagcg | 2820 |
| cgtgcgcgca | cacgtcgcgg | ccgtcctcga | gtacgacgac | ccgaccgcg | tcgaactcgg | 2880 |
| cctcaccttc | aaggagctgg | gcttcgactc | cctcatgtcc | gtcgagctgc | ggaacgcgct | 2940 |
| cgtcgacgac | acgggactgg | gcctgcccag | cggactgtct | ttcgaccacc | cgacgcgcgg | 3000 |
| cgccctcgcc | gcccacctgg | gcgacctgct | caccggcggc | agcggcgaga | ccggatcggc | 3060 |
| cgacgggata | ccgcccgcga | ccccggcgga | caccaccgcc | gagcccatcg | cgatcatcgg | 3120 |
| catggcctgc | cgctaccccc | gcggcgtcac | ctcccccgag | gacctgtggc | ggctcgtcgc | 3180 |
| cgaggggagc | gacgccgtct | cggggctgcc | caccgaccgc | ggctgggacg | aggacctctt | 3240 |
| cgacgccgac | cccgaccgca | gcggcaagag | ctcggctccg | gagggcggat | tcctgcacga | 3300 |
| cgccgccttg | ttcgacgccg | gcttcttcgg | gatatcgccc | cgcgaggccc | tcggcatgga | 3360 |
| cccgcagcag | cggctgctcc | tggagacggc | atgggaggcc | gtggagcgcg | cagggctcga | 3420 |
| ccccgaaggc | ctcaagggca | gccggacggc | cgtcttcgtc | ggcgccaccg | ccctggacta | 3480 |
| cggccgcgcg | atgcccagcg | gcgcgagggg | cgtcgagggc | cacctcctga | cggggaccac | 3540 |
| gcccagcgtg | atgtcggggc | gcctcgccta | ccagctgggc | ctcaccggctc | ctgcggtcac | 3600 |
| cgtcgacacg | gcctgctcgt | cctcgtcgtc | cgcgctgcac | ctggccgtcc | gttcgctgcg | 3660 |
| gcagggcgag | tcgagcctcg | cgctcgcggg | cggagcgacc | gtcatgtcga | caccggggcat | 3720 |
| gttcgtcgag | ttctcgcggc | agcgcggcct | cgccgcgcac | ggccgctcca | aggccttctc | 3780 |
| cgactccgcc | gacggcacct | cctggggcga | gggcgtcggc | ctcctcgtcg | tcgagcggct | 3840 |
| ctcggacgcc | gagcgcaacg | gccaccccgt | gctcgccgtg | atccggggca | gcgcgggtcaa | 3900 |
| ccaggacggc | gcctccaacg | ggctcaccgc | ccccaacggc | ccgtcccagc | agcgcgtcat | 3960 |
| cgacagggcc | ctggccgacg | cggggctcac | cccggccgag | gtcgacgccg | tcgaggcgca | 4020 |
| cggtaggggt | acccggtcgc | gcgaccccat | cgaggccgag | gcgatacctc | gcacctacgg | 4080 |
| ccgggaccgg | ggcgagggcg | ctccgctcca | gctcgggtcg | ctgaagtcga | acatcggcca | 4140 |
| cgcgagggcc | gcccgcggcg | tgggcgggct | catcaagatg | gtcctcgcga | tgcgccacgg | 4200 |
| cgtcctgccc | aggacgctcc | acgtggaccg | gcccaccacc | cgctcgcact | gggaggccgg | 4260 |
| cggcgtcgag | ctcctcaccg | aggagcggga | gtggccggag | acgggcccgc | cgcgccgcgc | 4320 |
| ggcgatctcc | tccttcggca | tcagcggcac | caacgcccac | atcgtggtcg | aacaggcccc | 4380 |
| ggaagccggg | gaggcgggcg | tcaccaccac | cgccccggaa | gcaggggaag | ccggggaagc | 4440 |
| ggcgacacc | accgccacca | cgacgcggcg | cgcggtcggc | gtccccgaac | ccgtacgcgc | 4500 |
| cccgtcgtg | gtctccgcgc | gggacgcgcg | cgccctgcgc | gcccaggccg | ttcggtcgcg | 4560 |
| gaccttcctc | gacggccgac | cggacgtcac | cgtcgcgcac | ctcggacgct | cgctggccgc | 4620 |
| ccgtaccgcc | ttcgagcaca | aggccgccct | caccaccgcc | accagggacg | agctgctcgc | 4680 |
| cgggctcgac | gccctcggcc | gcggggagca | agccacgggc | ctggtcaccg | gcgaaccggc | 4740 |
| cagggccgga | cgcacggcct | tcctgttcac | cggccaggga | gcgcagcgcg | tcgccatggg | 4800 |
| cgaggaactg | cgcgccgcgc | accccggtgt | cggccgcgcc | ctcgacaccg | tgtacgcggc | 4860 |
| cctcgaccgt | cacctcgacc | ggccgctgcg | ggagatcgtc | gccgccgggg | aggagctgga | 4920 |
| cctcaccgcg | tacaccagc | ccgccctctt | cgccttcgag | gtggcgctgt | tcgcctcctc | 4980 |
| cgaacaccac | ggcctcgtcc | ccgacctgtc | caccggccac | tccgtcggcg | agatcgccgc | 5040 |
| cgcgcacgtc | gcgggtgtcc | tctccctcga | cgacgcgcga | cgtctcgtca | ccgcccgcgg | 5100 |
| ccggctcatg | cagtcggccc | gcgagggcgg | cgcgatgac | gccgtgcagg | cgggcgaggg | 5160 |
| cgaggtcgtc | gagtccttga | agggtacga | gggcagggtc | gccgtcgccg | ccgtcaacgg | 5220 |
| acccaccgcc | gtggtcgtct | ccggcgacgc | ggacgcggcc | gaggagatcc | gcgccgtatg | 5280 |
| ggcgggacgc | ggccggcgca | cccgcaggct | gcgcgtcagc | cacgccttcc | actccccgca | 5340 |
| catggacgac | gtcctcgacg | agttcctccg | ggtcgccgag | ggcctgacct | tcgaggagcc | 5400 |
| cgggatcccc | gtcgtctcca | cggtcaccgg | cgcgctcgtc | acgtccggcg | agctcacctc | 5460 |
| gcccgcgtac | tgggtcgacc | agatccggcg | gcccgtgcgc | ttcctggacg | ccgtccgcac | 5520 |
| cctggccgcc | caggacgcga | ccgtcctcgt | cgagatcggc | cccagcgccg | tcctcacggc | 5580 |
| actcgccgag | gaggctctcg | cgccccggac | ggacgccccg | gacgccccgg | acgtcacggg | 5640 |
| cgtcccgtg | ctgcgcgcgg | ggcgccccga | gcccagagacc | ctcgccgcgc | gtctcgcgac | 5700 |
| cgcccattgtc | cacggcgcac | ccttggaccg | ggcgctcgtt | ttcccggacg | ggcgccgcac | 5760 |
| ggacctgccc | acgtacgcct | tcgggcgcga | gcactactgg | ctgacgcccg | aggccccgtac | 5820 |
| ggacgcccgc | gcactcggct | tcgacccggc | gcggcacccg | ctgctgacga | ccacggtcga | 5880 |
| ggtcgccggc | ggcgacggcg | tcctgctgac | cggccgtctc | tcctgaccg | accagccctg | 5940 |

| | | | | | | |
|-------------|------------|-------------|------------|------------|-------------|------|
| gctggccgac | cacatggtca | acggcgccgt | cctgttgccg | gccaccgcct | tcctggagct | 6000 |
| cgccctcgcg | gcgggcgacc | acgtcggggc | ggtccgggtg | gaggaactca | ccctcgaagc | 6060 |
| gccgctcgtc | ctgcccagac | ggggcgccgt | ccgcatccag | gtcggcgtag | gcgggcgacgg | 6120 |
| cgagtcgccc | gcccggcgca | ccttcgggtg | gtacagcacc | cccgaactcc | gcgacaccgg | 6180 |
| tgacgacgcg | ccccgggagt | ggaccgcgca | tgtctccggc | gtactcggcg | aaggggaccc | 6240 |
| ggccacggag | tcggaccacc | ccggcaccca | cggggacggt | tcagcggcct | ggccgcctgc | 6300 |
| ggcgggcgacc | gccacacccc | tcgacggcgt | ctacgaccgg | ctcgcgagac | tcgggtacgg | 6360 |
| atacgggtccg | gccttccagg | gcctgacggg | gctgtggcgc | gacggcgccg | acacgctcgc | 6420 |
| cgagatccgg | ctgcccgcgg | cgcagcacga | gagcgcgggg | ctcttcggcg | tacaccgcgg | 6480 |
| gctgctcgac | gcggcgctcc | acccgatcgt | cctggagggg | aactcagctg | ccggtgcctg | 6540 |
| tgacgccgat | accgacgcga | ccgaccggat | ccggctgcgg | ttcgcgtagg | cggggggtgac | 6600 |
| cctccacgcc | gaaggggcca | ccgcgctccg | cgtacggatc | acaccacccg | gcccggacac | 6660 |
| ggtcacgctc | cgctcaccg | acaccaccgg | tgccccgtg | gccaccgtgg | agtccctgac | 6720 |
| cctgcgcgcg | gtggcggaag | accggctggg | caccaccgcc | gggcgcgctc | acgacgcctc | 6780 |
| gttcacggtc | gtgtggacgg | agaccggcac | accggaaccc | gcagggcgcg | gagccgtgga | 6840 |
| ggtcgaggaa | ctcgtcgacc | tcgcccggct | cggcgacctc | gtggagctcg | gcgcccgcga | 6900 |
| cgtcgtcctc | cgggccgacc | gctggacgct | cgacggggac | ccgtccgcgg | ccgcgcgcac | 6960 |
| agccgtccgg | cgcaccctcg | ccatcgtcca | ggagtctctg | tccgagccgc | gcttcgacgg | 7020 |
| ctcgcgactg | gtgtgcgtag | ccagggggcg | ggtcgcgcga | ctccccggcg | aggacgtcac | 7080 |
| ctccctcgcc | accggccccc | tctggggcct | cgtccgctcc | gcccagtcgg | agaaccgggg | 7140 |
| acgcctgttc | ctcctggacc | tgggtgaagg | cgaaggcgag | cgcgacggag | ccgaggagct | 7200 |
| agccgcgcg | gccacggccg | gggacgagcg | gcagctcgcg | gcacgggacg | gccgactgct | 7260 |
| cgcgcgagg | ctggcccgtg | ccgcgcgcct | ttcagtgtag | gacaccgcgg | gcggcgccga | 7320 |
| ccgtttcggc | cccgcgagca | ccgtcctcgt | caccgggggg | accggaggcc | tcggagcgct | 7380 |
| cctcgcccgc | cacctcgtgg | agcgtcacgg | ggtgcgccgg | ctgctgctgg | tgagccgcgg | 7440 |
| cgggggccgac | gcccccgcg | cggccgacct | gggcgaggac | ctcgcgggcc | tcggcgcgga | 7500 |
| ggtggcgctt | gccgcccggc | acgccgcgca | ccgcgagagc | ctggcgcggg | cgatcgccac | 7560 |
| cgtgcccggc | gagcatccgc | tgacggccgt | cgtgcacacg | gcgggagtcg | tcgacgacgc | 7620 |
| gacggtggag | gcgctcacac | cggaacggct | ggacgcggta | ctgcgcccga | aggtcgacgc | 7680 |
| cgcggtggaac | ctgcacgagc | tcaccaagga | cctgcggctc | gacgccttcg | tcctcttctc | 7740 |
| ctccgtctcc | ggcatcgtcg | gcaccgcggg | ccagggcaac | tacgcggcgg | ccaacacggg | 7800 |
| cctcgacgcc | ctcgccgccc | accgcgcggc | cacgggcctg | gccgccacgt | cgctggcctg | 7860 |
| gggcctctgg | gacggcacgc | acggcatggg | cggcacgctc | ggcgccgcgg | acctcgcccg | 7920 |
| ctggagccgg | gcccgaatca | ccccgctcac | cccgtgcag | ggcctcgcg | tccttcgacg | 7980 |
| cgcggtcgcc | agggacgacg | ccctcctcgt | accgcgcggg | ctccgtccca | ccgcccaccg | 8040 |
| gggcacggac | ggacagcctc | ctgcgctgtg | gcgcggcctc | gtccggggcg | gcccgcgcgg | 8100 |
| tgccgcgcgg | acggccgcgg | aggcgggcga | cacgaccggc | ggctggctga | gcgggctcgc | 8160 |
| cgacagttcc | cccgaaggag | ggcgacgac | agccgtcacg | ctcgtgacgg | gtgtcgtcgc | 8220 |
| ggacgtcctc | gggcacgccc | actccgcgc | ggtcggggcg | gagcggtcct | tcaaggacct | 8280 |
| cggcttcgac | tccttgcccg | gggtggagct | ccgcaaccgg | ctgaacgcgg | ccaccggcct | 8340 |
| gcggctcccc | gcgaccacgg | tccttcgacca | tccttcgcgg | gccgcgctcg | cgtcccatct | 8400 |
| cctcgcccag | gtgcccgggt | tgaaggaggg | gacggcgggc | accgcgaccg | tcgtggccga | 8460 |
| gcggggcgct | tccttcgggt | accgtgcgac | cgacgacgat | ccgatcgcg | tcgtgggcat | 8520 |
| ggcatgccgc | tatccgggtg | gtgtgtcgtc | gccggaggac | ctgtggcggc | tggtggccga | 8580 |
| ggggacggac | gcgatcagcg | agtccccctg | caaccgcggc | tgggacctgg | agagcctcta | 8640 |
| cgaccgggat | cccgaagtcg | agggcaccac | gtactgccgg | gagggcgggg | tcctggaagg | 8700 |
| cgccggtagc | ttcgacgcgg | ccttcttcgg | catctcgccg | cgcgaggccc | tggtgatgga | 8760 |
| cccgcagcag | cggctgctgc | tggagggtgc | ctgggaggcg | ctggaacgcg | cgggcatcga | 8820 |
| cccgctcctc | ctgcgcggca | gccgcgggtg | tgtctacgtg | ggcgccgcgc | acggctcgta | 8880 |
| cgctccgat | ccccggctgg | tgcccgaggg | ctcggagggc | tatctgctga | ccggcagcgc | 8940 |
| cgacgcggtg | atgtccggcc | gcattctcta | cgcgctcggt | ctcgaaggac | cgtccatgac | 9000 |
| ggtggagacg | gcctgctcct | cctcgctggg | ggcgctgcat | ctggcggtac | gggcgctgcg | 9060 |
| gcacggcgag | tgccgggctc | cgctggcggg | cggggtggcg | gtgatggccg | atccggcggc | 9120 |
| gttcgtggag | ttctcccggc | agaaggggct | ggccgcggac | ggccgctgca | aggcgttctc | 9180 |
| ggccgcgcgc | gacggcaccg | gctgggcccga | gggcgtcggc | gtgctcgtcc | tgagcgggct | 9240 |
| gtcggaagcg | cgccgcggcg | ggcacacggt | cctcgccctg | gtcaccggga | ccgcggtcaa | 9300 |
| ccaggacggg | ggctccaacg | ggctgaccgc | gccccacggc | ccagcccagc | aacgcgtcat | 9360 |
| cgccgagggc | ctcgccgacg | ccgggctgtc | cccgaggagc | gtggacgcgg | tcgaggcgca | 9420 |
| cggcaccggc | acccggctcg | gcgaccccat | cgaggccggg | gcgctgctcg | ccgcctccgg | 9480 |
| acggaaccgt | tccggcgacc | acccgctgtg | gctcggctcg | ctgaagtcca | acatcgggca | 9540 |
| tgcccaggcc | gccgcgggtg | tcggcgcgct | catcaagatg | ctccaggcgc | tgcggcacgg | 9600 |
| cttgctgccc | cgcaccctcc | acgccgacga | gccgaccgcc | catgccgact | ggagctccgg | 9660 |

| | | | | | | |
|------------|------------|-------------|------------|-------------|-------------|-------|
| ccgggtacgg | ctgctcacct | ccgaggtgcc | gtggcagcgg | accggccggc | cccggcggac | 9720 |
| cggggtgtcc | gccttcggcg | tcggcgggcac | caatgcccac | gtcgtccctcg | aagaggcacc | 9780 |
| cgccccgccc | gcgcgggaac | cggccggggga | ggccccgggc | ggctcccgcg | ccgcagaagg | 9840 |
| ggcggaaagg | cccctggcct | gggtggtctc | cggacgcgac | gagccggccc | tgcggtccca | 9900 |
| ggcccgcgcg | ctccgcgacc | acctctcccg | caccccgggg | gcccggccgc | gtgacatcgc | 9960 |
| cttctccctc | gcccgcacgc | gcgcagcctt | tgaccaccgc | gccgtgctga | tcggctcgga | 10020 |
| cggggccgaa | ctcgccgcgc | ccctggacgc | gttggccgaa | ggacgcgacg | gtccggcggt | 10080 |
| ggtgcgcgga | gtccgcgacc | gggacggcag | gatggccttc | ctcttcaccg | ggcagggcag | 10140 |
| ccagcgcgcc | gggatggccc | acgacctgca | tgccgcccac | accttcttcg | cgtccgcctt | 10200 |
| cgacgaggtg | acggaccgtc | tcgacccgct | gctcgggcgg | ccgctcgggc | cgctgctgga | 10260 |
| cgcgcgaccc | ggctcgcccg | aagcggcact | cctggaccgg | accgagtaca | cccagccggc | 10320 |
| gctcttcgcc | gtcgaggtgg | cgctccaccg | gctgctggag | caactggggga | tgcgccccga | 10380 |
| cctgctgctg | gggcactcgg | tgggcgaact | ggcgggccgc | cacgtcgcg | gtgtgctcga | 10440 |
| tctcgacgac | gcctgcgcgc | tgggtggccgc | ccgcggcagg | ctgatgcagc | gcctgcccgc | 10500 |
| cggcgggcgc | atggtctcgc | tgccggccgg | cgaggacgag | gtccgcgcac | tgctggccgg | 10560 |
| ccgcgaggac | gccgtctgcg | tcgcccgcgt | gaacggcccc | cggtcggtgg | tgatctccgg | 10620 |
| cgcggaggaa | gcggtggccg | aggcggcggc | gcagctcgcc | ggacgaggcc | gccgcaccag | 10680 |
| gcggctccgc | gtcgcgacg | ccttccactc | acccctgatg | gacggcatgc | tcgcccggatt | 10740 |
| ccgggaggtc | gcccgcggcc | tgcgctaccg | ggaaccggag | ctgacggctc | tctccacggt | 10800 |
| cacggggcgg | cccgcgccgc | ccggtgaact | caccggcccc | gactactggg | tggcccagggt | 10860 |
| ccgtgagccc | gtgcgcttcg | cggacgcggt | ccgcacggca | caccgcctcg | gagcccgcac | 10920 |
| cttctgggac | accggcccg | acggcgtgct | gtgcggcatg | gcagaggagt | gcctggagga | 10980 |
| cgacaccgtg | gccctgctgc | cggcgatcca | caagcccggc | accgcgcgc | acggtccggc | 11040 |
| ggctcccggc | gcgctgcggg | cggccgcgc | cggtacggc | cggggcgccc | gggtggactg | 11100 |
| ggccgggatg | cacgccgacg | gccccgagg | gccggcccg | cgctcgaaac | tgcccgtcca | 11160 |
| cgccttcgg | caccgcccgt | actggctcgc | cccgggccc | gcggcggaac | ccgacgactg | 11220 |
| gatgtaccgg | atcggctggg | accggctgcc | ggctgtgacc | ggcggggccc | ggaccgccgg | 11280 |
| ccgctggctg | gtgatccacc | ccgacagccc | gcgctgccc | gagctgtccg | gccacgccga | 11340 |
| acgcgcgctg | cgcgcccgcg | gcgcgagccc | cgtaccgctg | cccgtggacg | ctccggccgc | 11400 |
| cgacggggcg | tccttcgcgg | caactgctgc | ctccgcacc | ggacctgaca | cacgaggtga | 11460 |
| cacagccgcg | cccgtggccg | gtgtgctgtc | gctgctgtcc | gaggaggatc | ggccccatcg | 11520 |
| ccagcacgcc | ccggtaccgc | ccggggtcct | ggcgacgctg | tccctgatgc | aggctatgga | 11580 |
| ggaggaggcg | gtggaggctc | gcgtgtggtg | cgtctcccgc | gccgcggctc | ccgcgccgga | 11640 |
| ccgggaacgg | cccgtcggcg | cgggcgcgc | cctgtggggg | ctggggcggg | tggccgcctt | 11700 |
| ggaacgcccc | acccggtggg | gcggtctcgt | ggacctgccc | gcctcgccc | gtgcggcgca | 11760 |
| ctggggcgcc | gccgtggaac | ggctcgccgg | tcccagggac | cagatcgccg | tgcgcgcgctc | 11820 |
| cggcagttgg | ggccggcgcc | tcaccaggct | gccgcgcgac | ggcggcgggc | ggacggccgc | 11880 |
| accgcgtac | cggccgcgcg | gcacgggtgt | cgtcacgggt | ggcaccggcg | cgctcggcgg | 11940 |
| gcatctcgcc | cgctggctcg | ccgcggcggg | cgcggaacac | ctggcgctca | ccagccgcgg | 12000 |
| gggcccggac | gcgcccggcg | ccgcgggact | cgaggccgaa | ctcctcctcc | tgggcgccaa | 12060 |
| ggtgacgttc | gccgcctgcg | acaccgccga | ccgcgacggc | ctcgcccggg | tcctgcgggc | 12120 |
| gataccggag | gacacccgcg | tcaccgcggt | gttccacgcc | gcgggctgac | cgcaggtcac | 12180 |
| gccgctgtcc | cgtacctcgc | ccgagcactt | cgcgcagctg | tacgcgggca | aggcggcggg | 12240 |
| cgccgcgcac | ctggacgaac | tgacccgcga | actcggcgcc | ggactcgacg | cgttcgtcct | 12300 |
| ctactcctcc | ggcgccggcg | tctggggcag | cgccggccag | ggtgcctacg | ccgcgcgcaa | 12360 |
| cgcgcgcttg | gacgcgctcg | cccggcgccg | tgccggcgac | ggactccccg | ccacctccat | 12420 |
| gccttggggc | gtgtggggcg | gcggcggtat | gggggcccgc | gaggcgggcg | cggagtatct | 12480 |
| gggcccggcg | ggtatgcgcc | ccatggcacc | ggtctccgcg | ctccggcgga | tggccaccgc | 12540 |
| catcgctcct | ggggaaacct | gccccaccgt | cacccacacc | gactgggagc | gcttcggcga | 12600 |
| gggcttcacc | gccttcggcg | ccagccctct | gatcgcgggg | ctcggcacgc | cgggcggcg | 12660 |
| ccgggcggg | gagacccccg | aggaggggaa | cgccaccgct | gcggcggaac | tcaccgcctt | 12720 |
| gccgcccggc | gaactccgca | ccgcgctgcg | cgagctgggt | cgagcccggga | ccgcgcgggc | 12780 |
| gctcggcctc | gacgaccggg | ccgaggtcgc | cgagggcgaa | cggttccccg | ccatgggctt | 12840 |
| cgactccctg | gccaccgtac | ggctgcgcgc | cggactcgcc | tcggccacgg | gcctcgacct | 12900 |
| gcccccgat | ctgctcttcg | accgggacac | cccggccgcg | ctcgccgccc | acctggccga | 12960 |
| actgctcgcc | accgcagggg | accacggacc | cggcgggccc | gggaccgggt | ccgcgcgggc | 13020 |
| cgatgcccga | agcggtctgc | cggccctcta | ccgggagggc | gtccgcaccg | gccgggcgcg | 13080 |
| ggaaatggcc | gaactgctcg | ccgcgcgttc | ccggttcgcg | cccgccttcg | ggacggcgga | 13140 |
| ccggcagccg | gtggccctcg | tgccgctggc | cgacggcgcg | gaggacaccg | ggctcccgtc | 13200 |
| gctcgtgggc | tgcgccggga | cggcggtggc | ctccggcccc | gtggagtcca | ccgccttcgc | 13260 |
| cggagcgctg | gcggacctcc | cggcggcggc | cccgatggcc | gcgctgccc | agcccggtt | 13320 |
| tctgccggga | gaacgagtcc | cggccacccc | ggaggcattg | tccgaggccc | aggcggaagc | 13380 |

| | | | | | | |
|-------------|-------------|------------|-------------|-------------|------------|-------|
| gctgctgcgc | tacgcggcgc | gccggccctt | cgtgctgctg | gggcactccg | ccggcgccaa | 13440 |
| catggcccac | gccctgaccc | gtcatctgga | ggcgaacggt | ggcgggcccc | cagggctggt | 13500 |
| gctcatggac | atctacaccc | ccgccgaccc | cggcgcgatg | ggcgtctggc | ggaacgacat | 13560 |
| gttccagtgg | gtctggcggc | gtcgcgacat | cccccgac | gaccaccgcc | tcacggccat | 13620 |
| gggcgcctac | caccggctgc | ttctcgactg | gtcggccacc | cccgtccgcg | ccccgtact | 13680 |
| gcatctgcgc | gccgcggaac | ccatgggcca | ctggccaccc | ggggacaccg | gctggcagtc | 13740 |
| ccactgggac | ggcgcgacac | ccaccgccgg | catccccgga | aaccacttca | cgatgatgac | 13800 |
| cgaacacgcc | tccgcgcgcc | cccggctcgt | gcacggctgg | ctcgcggaac | ggaccccgtc | 13860 |
| cgggcagggc | gggtcaccgt | cccgcgcggc | ggggagagag | gagaggccgt | gaacacggca | 13920 |
| gccggccccga | ccggcaccgc | cgccggcggc | accaccgccc | cggcgggcggc | acacgacctg | 13980 |
| tcccgcgccg | gacgcaggct | ccaactcacc | cgggcccgcac | agtggttcgc | cggcaaccag | 14040 |
| ggagaccctt | acgggatgat | cctgcgcgcc | ggcaccgcgg | acccggcacc | gtacgaggaa | 14100 |
| gagatccccg | ggtaccgagc | tcgaattctt | aattaaggag | gtcgtagatg | agtaacaaga | 14160 |
| acaacgatga | gctgcagcgg | caggcctcgg | aaaacacctt | ggggctgaac | ccggtcatcg | 14220 |
| gtatccgcgc | caaagacctg | ttgagctcgg | cacgcaccgt | gctgcgccag | gccgtgcgcc | 14280 |
| aaccgctgca | cagcgccaag | catgtggccc | actttggcct | ggagctgaag | aacgtgctgc | 14340 |
| tgggcaagtc | cagccttgcc | ccggaagcgc | acgaccgtcg | cttcaatgac | ccggcatgga | 14400 |
| gcaacaaccc | actttaccgc | cgctacctgc | aaacctatct | ggcctggcgc | aaggagctgc | 14460 |
| aggactggat | cggcaacagc | gacctgtcgc | cccaggacat | cagccgcggc | cagttcgtca | 14520 |
| tcaacctgat | gaccgaagcc | atggctccga | ccaacacctt | gtccaacccg | gcagcagtca | 14580 |
| aacgcttctt | cgaaacgggc | ggcaagagcc | tgctcgatgg | cctgtccaac | ctggccaagg | 14640 |
| acctggtcaa | caacggtgcc | atgccagcc | aggatgaacat | ggacgccttc | gaggtgggca | 14700 |
| agaacctggg | caccagtga | ggcgccgtgg | tgtaccgcaa | cgatgtgctg | gagctgatcc | 14760 |
| agtacaagcc | catcaccgag | caggtgcatg | cccggccgct | gctggtggtg | ccgccgcaga | 14820 |
| tcaacaagtt | ctacgtattc | gacctgagcc | cggaaaagag | cctggcacgc | tactgcctgc | 14880 |
| gctcgcagca | gcagaccttc | atcatcagct | ggcgcaaccc | gaccaaagcc | cagcgcgaat | 14940 |
| ggggcctgtc | cacctacatc | gacgcgctca | aggaggcggt | cgacgcggtg | ctggcgatta | 15000 |
| ccggcagcaa | ggacctgaac | atgctcgggt | cctgctccgg | cggcatcacc | tgcacggcat | 15060 |
| tggtcggcca | ctatgccgcc | ctcggcgaaa | acaaggtcaa | tgccctgacc | ctgctggtca | 15120 |
| gcgtgctgga | caccaccatg | gacaaccagg | tcgccctggt | cgtcgacgag | cagactttgg | 15180 |
| aggccgccaa | gcgccactcc | taccaggccg | gtgtgctcga | aggcagcgag | atggccaagg | 15240 |
| tggttcgcctg | gatgcgcccc | aacgacctga | tctggaacta | ctgggtcaac | aactacctgc | 15300 |
| tcggcaacga | gccgcgggtg | ttcgacatcc | tgttctggaa | caacgacacc | acgcgcctgc | 15360 |
| cggccgcctt | ccacggcgac | ctgatcgaaa | tgttcaagag | caaccgcgtg | acccgcccgg | 15420 |
| acgccctgga | ggtttgcggc | actccgatcg | acctgaaaca | ggtcaaatgc | gacatctaca | 15480 |
| gccttgccgg | caccaacgac | cacatcacc | cgtggcagtc | atgctaccgc | tcggcgcacc | 15540 |
| tgttcggcgg | caagatccgag | ttcgtgctgt | ccaacagcgg | ccacatccag | agcatectca | 15600 |
| accgcgcagg | gaacccaaag | gcgcgcttca | tgaccgggtg | cgatcgcccg | ggtgaccggg | 15660 |
| tggcctggga | ggaaaaacgcc | accaagcatg | ccgactcctg | gtggctgcac | tggcaaagct | 15720 |
| ggctggggcga | gcgtgccggc | gagctggaaa | aggcgccgac | ccgcctgggc | aaccgtgcct | 15780 |
| atgccgctgg | cgaggcatcc | ccgggcacct | acgttcacga | gcgttgagct | gcagcgccgt | 15840 |
| ggccacctgc | gggacgccac | ggtgttgaat | tc | | | 15872 |

<210> 2

<211> 4630

<212> PRT

<213> Streptomyces venezuelae

<400> 2

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Asn | Glu | Ala | Ile | Ala | Val | Val | Gly | Met | Ser | Cys | Arg | Leu | Pro | Lys |
| 1 | | | | 5 | | | | 10 | | | | | | 15 | |
| Ala | Ser | Asn | Pro | Ala | Ala | Phe | Trp | Glu | Leu | Leu | Arg | Asn | Gly | Glu | Ser |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Ala | Val | Thr | Asp | Val | Pro | Ser | Gly | Arg | Trp | Thr | Ser | Val | Leu | Gly | Gly |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Ala | Asp | Ala | Glu | Glu | Pro | Ala | Glu | Ser | Gly | Val | Arg | Arg | Gly | Gly | Phe |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Leu | Asp | Ser | Leu | Asp | Leu | Phe | Asp | Ala | Ala | Phe | Phe | Gly | Ile | Ser | Pro |
| 65 | | | | | 70 | | | | 75 | | | | | 80 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | Glu | Ala | Ala | Ala | Met | Asp | Pro | Gln | Gln | Arg | Leu | Val | Leu | Glu | Leu |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Ala | Trp | Glu | Ala | Leu | Glu | Asp | Ala | Gly | Ile | Val | Pro | Gly | Thr | Leu | Ala |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Gly | Ser | Arg | Thr | Ala | Val | Phe | Val | Gly | Thr | Leu | Arg | Asp | Asp | Tyr | Thr |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Ser | Leu | Leu | Tyr | Gln | His | Gly | Glu | Gln | Ala | Ile | Thr | Gln | His | Thr | Met |
| | | 130 | | | | 135 | | | | | 140 | | | | |
| Ala | Gly | Val | Asn | Arg | Gly | Val | Ile | Ala | Asn | Arg | Val | Ser | Tyr | His | Leu |
| | | | | | 150 | | | | | 155 | | | | | 160 |
| Gly | Leu | Gln | Gly | Pro | Ser | Leu | Thr | Val | Asp | Ala | Ala | Gln | Ser | Ser | Ser |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Leu | Val | Ala | Val | His | Leu | Ala | Cys | Glu | Ser | Leu | Arg | Ala | Gly | Glu | Ser |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Thr | Thr | Ala | Leu | Val | Ala | Gly | Val | Asn | Leu | Asn | Ile | Leu | Ala | Glu | Ser |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Ala | Val | Thr | Glu | Glu | Arg | Phe | Gly | Gly | Leu | Ser | Pro | Asp | Gly | Thr | Ala |
| | | 210 | | | | 215 | | | | | 220 | | | | |
| Tyr | Thr | Phe | Asp | Ala | Arg | Ala | Asn | Gly | Phe | Val | Arg | Gly | Glu | Gly | Gly |
| | | 225 | | | | 230 | | | | 235 | | | | | 240 |
| Gly | Val | Val | Val | Leu | Lys | Pro | Leu | Ser | Arg | Ala | Leu | Ala | Asp | Gly | Asp |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Arg | Val | His | Gly | Val | Ile | Arg | Ala | Ser | Ala | Val | Asn | Asn | Asp | Gly | Ala |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Thr | Pro | Gly | Leu | Thr | Val | Pro | Ser | Arg | Ala | Ala | Gln | Glu | Lys | Val | Leu |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Arg | Glu | Ala | Tyr | Arg | Lys | Ala | Ala | Leu | Asp | Pro | Ser | Ala | Val | Gln | Tyr |
| | | 290 | | | | 295 | | | | 300 | | | | | |
| Val | Glu | Leu | His | Gly | Thr | Gly | Thr | Pro | Val | Gly | Asp | Pro | Ile | Glu | Ala |
| | | | | 310 | | | | | | 315 | | | | | 320 |
| Ala | Ala | Leu | Gly | Ala | Val | Leu | Gly | Ser | Ala | Arg | Pro | Ala | Asp | Glu | Pro |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Leu | Leu | Val | Gly | Ser | Ala | Lys | Thr | Asn | Val | Gly | His | Leu | Glu | Gly | Ala |
| | | | 340 | | | | | 345 | | | | 350 | | | |
| Ala | Gly | Ile | Val | Gly | Leu | Ile | Lys | Thr | Leu | Leu | Ala | Leu | Gly | Arg | Arg |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Arg | Ile | Pro | Ala | Ser | Leu | Asn | Phe | Arg | Thr | Pro | His | Pro | Asp | Ile | Pro |
| | | 370 | | | | 375 | | | | | 380 | | | | |
| Leu | Asp | Thr | Leu | Gly | Leu | Asp | Val | Pro | Asp | Gly | Leu | Arg | Glu | Trp | Pro |
| | | | | 390 | | | | | | 395 | | | | | 400 |
| His | Pro | Asp | Arg | Glu | Leu | Leu | Ala | Gly | Val | Ser | Ser | Phe | Gly | Met | Gly |
| | | | | 405 | | | | | 410 | | | | | 415 | |
| Gly | Thr | Asn | Ala | His | Val | Val | Leu | Ser | Glu | Gly | Pro | Ala | Gln | Gly | Gly |
| | | | 420 | | | | | 425 | | | | | 430 | | |
| Glu | Gln | Pro | Gly | Ile | Asp | Glu | Glu | Thr | Pro | Val | Asp | Ser | Gly | Ala | Ala |
| | | 435 | | | | | 440 | | | | | 445 | | | |
| Leu | Pro | Phe | Val | Val | Thr | Gly | Arg | Gly | Gly | Glu | Ala | Leu | Arg | Ala | Gln |
| | | 450 | | | | 455 | | | | | 460 | | | | |
| Ala | Arg | Arg | Leu | His | Glu | Ala | Val | Glu | Ala | Asp | Pro | Glu | Leu | Ala | Pro |
| | | | | | 470 | | | | | 475 | | | | | 480 |
| Ala | Ala | Leu | Ala | Arg | Ser | Leu | Val | Thr | Thr | Arg | Thr | Val | Phe | Thr | His |
| | | | | 485 | | | | | 490 | | | | | 495 | |
| Arg | Ser | Val | Val | Leu | Ala | Pro | Asp | Arg | Ala | Arg | Leu | Leu | Asp | Gly | Leu |
| | | | 500 | | | | | 505 | | | | | 510 | | |
| Gly | Ala | Leu | Ala | Ala | Gly | Thr | Pro | Ala | Pro | Gly | Val | Val | Thr | Gly | Thr |
| | | 515 | | | | | 520 | | | | | 525 | | | |
| Pro | Ala | Pro | Gly | Arg | Leu | Ala | Val | Leu | Phe | Ser | Gly | Gln | Gly | Ala | Gln |
| | | 530 | | | | 535 | | | | | 540 | | | | |
| Arg | Thr | Gly | Met | Gly | Met | Glu | Leu | Tyr | Ala | Ala | His | Pro | Ala | Phe | Ala |
| | | | | 550 | | | | | | 555 | | | | | 560 |
| Thr | Ala | Phe | Asp | Ala | Val | Ala | Ala | Glu | Leu | Asp | Pro | Leu | Leu | Asp | Arg |
| | | | | 565 | | | | | 570 | | | | | 575 | |

| | | | | | | | | | | | | | | | | | |
|-----|------|-----|------|------|------|------|-----|------|------|------|------|------|------|------|------|--|--|
| Pro | Leu | Ala | Glu | Leu | Val | Ala | Ala | Gly | Asp | Thr | Leu | Asp | Arg | Thr | Val | | |
| | | | 580 | | | | | 585 | | | | | 590 | | | | |
| His | Thr | Gln | Pro | Ala | Leu | Phe | Ala | Val | Glu | Val | Ala | Leu | His | Arg | Leu | | |
| | | 595 | | | | | 600 | | | | | 605 | | | | | |
| Val | Glu | Ser | Trp | Gly | Val | Thr | Pro | Asp | Leu | Leu | Ala | Gly | His | Ser | Val | | |
| | 610 | | | | | 615 | | | | | 620 | | | | | | |
| Gly | Glu | Ile | Ser | Ala | Ala | His | Val | Ala | Gly | Val | Leu | Ser | Leu | Arg | Asp | | |
| | 625 | | | | 630 | | | | | 635 | | | | | 640 | | |
| Ala | Ala | Arg | Leu | Val | Ala | Ala | Arg | Gly | Arg | Leu | Met | Gln | Ala | Leu | Pro | | |
| | | | | 645 | | | | | 650 | | | | | 655 | | | |
| Glu | Gly | Gly | Ala | Met | Val | Ala | Val | Glu | Ala | Ser | Glu | Glu | Glu | Val | Leu | | |
| | | | 660 | | | | | 665 | | | | | 670 | | | | |
| Pro | His | Leu | Ala | Gly | Arg | Glu | Arg | Glu | Leu | Ser | Leu | Ala | Ala | Val | Asn | | |
| | | 675 | | | | | 680 | | | | | 685 | | | | | |
| Gly | Pro | Arg | Ala | Val | Val | Leu | Ala | Gly | Ala | Glu | Arg | Ala | Val | Leu | Asp | | |
| | 690 | | | | | 695 | | | | | 700 | | | | | | |
| Val | Ala | Glu | Leu | Leu | Arg | Glu | Gln | Gly | Arg | Arg | Thr | Lys | Arg | Leu | Ser | | |
| | 705 | | | | 710 | | | | | 715 | | | | | 720 | | |
| Val | Ser | His | Ala | Phe | His | Ser | Pro | Leu | Met | Glu | Pro | Met | Leu | Asp | Asp | | |
| | | | | 725 | | | | | 730 | | | | | 735 | | | |
| Phe | Arg | Arg | Val | Val | Glu | Glu | Leu | Asp | Phe | Gln | Glu | Pro | Arg | Val | Asp | | |
| | | | 740 | | | | | 745 | | | | | 750 | | | | |
| Val | Val | Ser | Thr | Val | Thr | Gly | Leu | Pro | Val | Thr | Ala | Gly | Gln | Trp | Thr | | |
| | | 755 | | | | 760 | | | | | | 765 | | | | | |
| Asp | Pro | Glu | Tyr | Trp | Val | Asp | Gln | Val | Arg | Arg | Pro | Val | Arg | Phe | Leu | | |
| | 770 | | | | | 775 | | | | | 780 | | | | | | |
| Asp | Ala | Val | Arg | Thr | Leu | Glu | Glu | Ser | Gly | Ala | Asp | Thr | Phe | Leu | Glu | | |
| | 785 | | | | 790 | | | | | 795 | | | | | 800 | | |
| Leu | Gly | Pro | Asp | Gly | Val | Cys | Ser | Ala | Met | Ala | Ala | Asp | Ser | Val | Arg | | |
| | | | | 805 | | | | | 810 | | | | | 815 | | | |
| Asp | Gln | Glu | Ala | Ala | Thr | Ala | Val | Ser | Ala | Leu | Arg | Lys | Gly | Arg | Pro | | |
| | | | 820 | | | | | 825 | | | | | 830 | | | | |
| Glu | Pro | Gln | Ser | Leu | Leu | Ala | Ala | Leu | Thr | Thr | Val | Phe | Val | Arg | Gly | | |
| | | 835 | | | | | 840 | | | | | 845 | | | | | |
| His | Asp | Val | Asp | Trp | Thr | Ala | Ala | His | Gly | Ser | Thr | Gly | Thr | Val | Arg | | |
| | 850 | | | | | 855 | | | | | 860 | | | | | | |
| Val | Pro | Leu | Pro | Thr | Tyr | Ala | Phe | Gln | Arg | Glu | Arg | His | Trp | Phe | Asp | | |
| | 865 | | | | 870 | | | | | 875 | | | | | 880 | | |
| Gly | Ala | Ala | Arg | Thr | Ala | Ala | Pro | Leu | Thr | Ala | Gly | Arg | Ser | Gly | Thr | | |
| | | | | 885 | | | | | 890 | | | | | 895 | | | |
| Gly | Ala | Gly | Thr | Gly | Pro | Ala | Ala | Gly | Val | Thr | Ser | Gly | Glu | Gly | Glu | | |
| | | | 900 | | | | | 905 | | | | | 910 | | | | |
| Gly | Glu | Gly | Glu | Gly | Ala | Gly | Ala | Gly | Gly | Gly | Asp | Arg | Pro | Ala | Arg | | |
| | | 915 | | | | 920 | | | | | | 925 | | | | | |
| His | Glu | Thr | Thr | Glu | Arg | Val | Arg | Ala | His | Val | Ala | Ala | Val | Leu | Glu | | |
| | 930 | | | | | 935 | | | | | 940 | | | | | | |
| Tyr | Asp | Asp | Pro | Thr | Arg | Val | Glu | Leu | Gly | Leu | Thr | Phe | Lys | Glu | Leu | | |
| | 945 | | | | 950 | | | | | 955 | | | | | 960 | | |
| Gly | Phe | Asp | Ser | Leu | Met | Ser | Val | Glu | Leu | Arg | Asn | Ala | Leu | Val | Asp | | |
| | | | | 965 | | | | | 970 | | | | | 975 | | | |
| Asp | Thr | Gly | Leu | Arg | Leu | Pro | Ser | Gly | Leu | Leu | Phe | Asp | His | Pro | Thr | | |
| | | | 980 | | | | | 985 | | | | | 990 | | | | |
| Pro | Arg | Ala | Leu | Ala | Ala | His | Leu | Gly | Asp | Leu | Leu | Thr | Gly | Gly | Ser | | |
| | | 995 | | | | 1000 | | | | | | 1005 | | | | | |
| Gly | Glu | Thr | Gly | Ser | Ala | Asp | Gly | Ile | Pro | Pro | Ala | Thr | Pro | Ala | Asp | | |
| | 1010 | | | | | 1015 | | | | | 1020 | | | | | | |
| Thr | Thr | Ala | Glu | Pro | Ile | Ala | Ile | Ile | Gly | Met | Ala | Cys | Arg | Tyr | Pro | | |
| | 1025 | | | | 1030 | | | | | 1035 | | | | | 1040 | | |
| Gly | Gly | Val | Thr | Ser | Pro | Glu | Asp | Leu | Trp | Arg | Leu | Val | Ala | Glu | Gly | | |
| | | | | 1045 | | | | | 1050 | | | | | 1055 | | | |
| Arg | Asp | Ala | Val | Ser | Gly | Leu | Pro | Thr | Asp | Arg | Gly | Trp | Asp | Glu | Asp | | |
| | | | 1060 | | | | | 1065 | | | | | 1070 | | | | |

Leu Phe Asp Ala Asp Pro Asp Arg Ser Gly Lys Ser Ser Val Arg Glu
 1075 1080 1085
 Gly Gly Phe Leu His Asp Ala Ala Leu Phe Asp Ala Gly Phe Phe Gly
 1090 1095 1100
 Ile Ser Pro Arg Glu Ala Leu Gly Met Asp Pro Gln Gln Arg Leu Leu
 1105 1110 1115 1120
 Leu Glu Thr Ala Trp Glu Ala Val Glu Arg Ala Gly Leu Asp Pro Glu
 1125 1130 1135
 Gly Leu Lys Gly Ser Arg Thr Ala Val Phe Val Gly Ala Thr Ala Leu
 1140 1145 1150
 Asp Tyr Gly Pro Arg Met His Asp Gly Ala Glu Gly Val Glu Gly His
 1155 1160 1165
 Leu Leu Thr Gly Thr Thr Pro Ser Val Met Ser Gly Arg Ile Ala Tyr
 1170 1175 1180
 Gln Leu Gly Leu Thr Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser
 1185 1190 1195 1200
 Ser Ser Leu Val Ala Leu His Leu Ala Val Arg Ser Leu Arg Gln Gly
 1205 1210 1215
 Glu Ser Ser Leu Ala Leu Ala Gly Gly Ala Thr Val Met Ser Thr Pro
 1220 1225 1230
 Gly Met Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Ala Asp Gly
 1235 1240 1245
 Arg Ser Lys Ala Phe Ser Asp Ser Ala Asp Gly Thr Ser Trp Ala Glu
 1250 1255 1260
 Gly Val Gly Leu Leu Val Val Glu Arg Leu Ser Asp Ala Glu Arg Asn
 1265 1270 1275 1280
 Gly His Pro Val Leu Ala Val Ile Arg Gly Ser Ala Val Asn Gln Asp
 1285 1290 1295
 Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg
 1300 1305 1310
 Val Ile Arg Gln Ala Leu Ala Asp Ala Gly Leu Thr Pro Ala Asp Val
 1315 1320 1325
 Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile
 1330 1335 1340
 Glu Ala Glu Ala Ile Leu Gly Thr Tyr Gly Arg Asp Arg Gly Glu Gly
 1345 1350 1355 1360
 Ala Pro Leu Gln Leu Gly Ser Leu Lys Ser Asn Ile Gly His Ala Gln
 1365 1370 1375
 Ala Ala Ala Gly Val Gly Gly Leu Ile Lys Met Val Leu Ala Met Arg
 1380 1385 1390
 His Gly Val Leu Pro Arg Thr Leu His Val Asp Arg Pro Thr Thr Arg
 1395 1400 1405
 Val Asp Trp Glu Ala Gly Gly Val Glu Leu Leu Thr Glu Glu Arg Glu
 1410 1415 1420
 Trp Pro Glu Thr Gly Arg Pro Arg Arg Ala Ala Ile Ser Ser Phe Gly
 1425 1430 1435 1440
 Ile Ser Gly Thr Asn Ala His Ile Val Val Glu Gln Ala Pro Glu Ala
 1445 1450 1455
 Gly Glu Ala Ala Val Thr Thr Thr Ala Pro Glu Ala Gly Glu Ala Gly
 1460 1465 1470
 Glu Ala Ala Asp Thr Thr Ala Thr Thr Thr Pro Ala Ala Val Gly Val
 1475 1480 1485
 Pro Glu Pro Val Arg Ala Pro Val Val Val Ser Ala Arg Asp Ala Ala
 1490 1495 1500
 Ala Leu Arg Ala Gln Ala Val Arg Leu Arg Thr Phe Leu Asp Gly Arg
 1505 1510 1515 1520
 Pro Asp Val Thr Val Ala Asp Leu Gly Arg Ser Leu Ala Ala Arg Thr
 1525 1530 1535
 Ala Phe Glu His Lys Ala Ala Leu Thr Thr Ala Thr Arg Asp Glu Leu
 1540 1545 1550
 Leu Ala Gly Leu Asp Ala Leu Gly Arg Gly Glu Gln Ala Thr Gly Leu
 1555 1560 1565

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Val | Thr | Gly | Glu | Pro | Ala | Arg | Ala | Gly | Arg | Thr | Ala | Phe | Leu | Phe | Thr | 1570 | 1575 | 1580 |
| Gly | Gln | Gly | Ala | Gln | Arg | Val | Ala | Met | Gly | Glu | Glu | Leu | Arg | Ala | Ala | 1585 | 1590 | 1595 |
| His | Pro | Val | Phe | Ala | Ala | Ala | Leu | Asp | Thr | Val | Tyr | Ala | Ala | Leu | Asp | 1600 | 1605 | 1610 |
| Arg | His | Leu | Asp | Arg | Pro | Leu | Arg | Glu | Ile | Val | Ala | Ala | Gly | Glu | Glu | 1615 | 1620 | 1625 |
| Leu | Asp | Leu | Thr | Ala | Tyr | Thr | Gln | Pro | Ala | Leu | Phe | Ala | Phe | Glu | Val | 1630 | 1635 | 1640 |
| Ala | Leu | Phe | Arg | Leu | Leu | Glu | His | His | Gly | Leu | Val | Pro | Asp | Leu | Leu | 1645 | 1650 | 1655 |
| Thr | Gly | His | Ser | Val | Gly | Glu | Ile | Ala | Ala | Ala | His | Val | Ala | Gly | Val | 1660 | 1665 | 1670 |
| Leu | Ser | Leu | Asp | Asp | Ala | Ala | Arg | Leu | Val | Thr | Ala | Arg | Gly | Arg | Leu | 1675 | 1680 | 1685 |
| Met | Gln | Ser | Ala | Arg | Glu | Gly | Gly | Ala | Met | Ile | Ala | Val | Gln | Ala | Gly | 1690 | 1700 | 1705 |
| Glu | Ala | Glu | Val | Val | Glu | Ser | Leu | Lys | Gly | Tyr | Glu | Gly | Arg | Val | Ala | 1710 | 1715 | 1720 |
| Val | Ala | Ala | Val | Asn | Gly | Pro | Thr | Ala | Val | Val | Val | Ser | Gly | Asp | Ala | 1725 | 1730 | 1735 |
| Asp | Ala | Ala | Glu | Glu | Ile | Arg | Ala | Val | Trp | Ala | Gly | Arg | Gly | Arg | Arg | 1740 | 1745 | 1750 |
| Thr | Arg | Arg | Leu | Arg | Val | Ser | His | Ala | Phe | His | Ser | Pro | His | Met | Asp | 1755 | 1760 | 1765 |
| Asp | Val | Leu | Asp | Glu | Phe | Leu | Arg | Val | Ala | Glu | Gly | Leu | Thr | Phe | Glu | 1770 | 1775 | 1780 |
| Glu | Pro | Arg | Ile | Pro | Val | Val | Ser | Thr | Val | Thr | Gly | Ala | Leu | Val | Thr | 1785 | 1790 | 1795 |
| Ser | Gly | Glu | Leu | Thr | Ser | Pro | Ala | Tyr | Trp | Val | Asp | Gln | Ile | Arg | Arg | 1800 | 1805 | 1810 |
| Pro | Val | Arg | Phe | Leu | Asp | Ala | Val | Arg | Thr | Leu | Ala | Ala | Gln | Asp | Ala | 1815 | 1820 | 1825 |
| Thr | Val | Leu | Val | Glu | Ile | Gly | Pro | Asp | Ala | Val | Leu | Thr | Ala | Leu | Ala | 1830 | 1835 | 1840 |
| Glu | Glu | Ala | Leu | Ala | Pro | Gly | Thr | Asp | Ala | Pro | Asp | Ala | Arg | Asp | Val | 1845 | 1850 | 1855 |
| Thr | Val | Val | Pro | Leu | Leu | Arg | Ala | Gly | Arg | Pro | Glu | Pro | Glu | Thr | Leu | 1860 | 1865 | 1870 |
| Ala | Ala | Gly | Leu | Ala | Thr | Ala | His | Val | His | Gly | Ala | Pro | Leu | Asp | Arg | 1875 | 1880 | 1885 |
| Ala | Ser | Phe | Phe | Pro | Asp | Gly | Arg | Arg | Thr | Asp | Leu | Pro | Thr | Tyr | Ala | 1890 | 1895 | 1900 |
| Phe | Arg | Arg | Glu | His | Tyr | Trp | Leu | Thr | Pro | Glu | Ala | Arg | Thr | Asp | Ala | 1905 | 1910 | 1915 |
| Arg | Ala | Leu | Gly | Phe | Asp | Pro | Ala | Arg | His | Pro | Leu | Leu | Thr | Thr | Thr | 1920 | 1925 | 1930 |
| Val | Glu | Val | Ala | Gly | Gly | Asp | Gly | Val | Leu | Leu | Thr | Gly | Arg | Leu | Ser | 1935 | 1940 | 1945 |
| Leu | Thr | Asp | Gln | Pro | Trp | Leu | Ala | Asp | His | Met | Val | Asn | Gly | Ala | Val | 1950 | 1955 | 1960 |
| Leu | Leu | Pro | Ala | Thr | Ala | Phe | Leu | Glu | Leu | Ala | Leu | Ala | Ala | Gly | Asp | 1965 | 1970 | 1975 |
| His | Val | Gly | Ala | Val | Arg | Val | Glu | Glu | Leu | Thr | Leu | Glu | Ala | Pro | Leu | 1980 | 1985 | 1990 |
| Val | Leu | Pro | Glu | Arg | Gly | Ala | Val | Arg | Ile | Gln | Val | Gly | Val | Ser | Gly | 1995 | 2000 | 2005 |
| Asp | Gly | Glu | Ser | Pro | Ala | Gly | Arg | Thr | Phe | Gly | Val | Tyr | Ser | Thr | Pro | 2010 | 2015 | 2020 |
| Asp | Ser | Gly | Asp | Thr | Gly | Asp | Asp | Ala | Pro | Arg | Glu | Trp | Thr | Arg | His | 2025 | 2030 | 2035 |
| | | | | | | | | | | | | | | | | 2040 | 2045 | 2050 |
| | | | | | | | | | | | | | | | | 2055 | 2060 | |

| | | | | | | | | | | | | | | | |
|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Val | Ser | Gly | Val | Leu | Gly | Glu | Gly | Asp | Pro | Ala | Thr | Glu | Ser | Asp | His |
| 2065 | | | | | 2070 | | | | | 2075 | | | | | 2080 |
| Pro | Gly | Thr | Asp | Gly | Asp | Gly | Ser | Ala | Ala | Trp | Pro | Pro | Ala | Ala | Ala |
| | | | | 2085 | | | | | 2090 | | | | | 2095 | |
| Thr | Ala | Thr | Pro | Leu | Asp | Gly | Val | Tyr | Asp | Arg | Leu | Ala | Glu | Leu | Gly |
| | | | 2100 | | | | | 2105 | | | | | 2110 | | |
| Tyr | Gly | Tyr | Gly | Pro | Ala | Phe | Gln | Gly | Leu | Thr | Gly | Leu | Trp | Arg | Asp |
| | 2115 | | | | | | 2120 | | | | | 2125 | | | |
| Gly | Ala | Asp | Thr | Leu | Ala | Glu | Ile | Arg | Leu | Pro | Ala | Ala | Gln | His | Glu |
| | 2130 | | | | | 2135 | | | | | 2140 | | | | |
| Ser | Ala | Gly | Leu | Phe | Gly | Val | His | Pro | Ala | Leu | Leu | Asp | Ala | Ala | Leu |
| 2145 | | | | | 2150 | | | | | 2155 | | | | | 2160 |
| His | Pro | Ile | Val | Leu | Glu | Gly | Asn | Ser | Ala | Ala | Gly | Ala | Cys | Asp | Ala |
| | | | 2165 | | | | | | 2170 | | | | | 2175 | |
| Asp | Thr | Asp | Ala | Thr | Asp | Arg | Ile | Arg | Leu | Pro | Phe | Ala | Trp | Ala | Gly |
| | | | 2180 | | | | | 2185 | | | | | 2190 | | |
| Val | Thr | Leu | His | Ala | Glu | Gly | Ala | Thr | Ala | Leu | Arg | Val | Arg | Ile | Thr |
| | 2195 | | | | | | 2200 | | | | | 2205 | | | |
| Pro | Thr | Gly | Pro | Asp | Thr | Val | Thr | Leu | Arg | Leu | Thr | Asp | Thr | Thr | Gly |
| | 2210 | | | | | 2215 | | | | | 2220 | | | | |
| Ala | Pro | Val | Ala | Thr | Val | Glu | Ser | Leu | Thr | Leu | Arg | Ala | Val | Ala | Lys |
| 2225 | | | | | 2230 | | | | | 2235 | | | | | 2240 |
| Asp | Arg | Leu | Gly | Thr | Thr | Ala | Gly | Arg | Val | Asp | Asp | Ala | Leu | Phe | Thr |
| | | | 2245 | | | | | | 2250 | | | | | 2255 | |
| Val | Val | Trp | Thr | Glu | Thr | Gly | Thr | Pro | Glu | Pro | Ala | Gly | Arg | Gly | Ala |
| | | | 2260 | | | | | 2265 | | | | | 2270 | | |
| Val | Glu | Val | Glu | Glu | Leu | Val | Asp | Leu | Ala | Gly | Leu | Gly | Asp | Leu | Val |
| | 2275 | | | | | | 2280 | | | | | 2285 | | | |
| Glu | Leu | Gly | Ala | Ala | Asp | Val | Val | Leu | Arg | Ala | Asp | Arg | Trp | Thr | Leu |
| | 2290 | | | | | 2295 | | | | | 2300 | | | | |
| Asp | Gly | Asp | Pro | Ser | Ala | Ala | Ala | Arg | Thr | Ala | Val | Arg | Arg | Thr | Leu |
| 2305 | | | | | 2310 | | | | | 2315 | | | | | 2320 |
| Ala | Ile | Val | Gln | Glu | Phe | Leu | Ser | Glu | Pro | Arg | Phe | Asp | Gly | Ser | Arg |
| | | | 2325 | | | | | | 2330 | | | | | 2335 | |
| Leu | Val | Cys | Val | Thr | Arg | Gly | Ala | Val | Ala | Ala | Leu | Pro | Gly | Glu | Asp |
| | | | 2340 | | | | | 2345 | | | | | 2350 | | |
| Val | Thr | Ser | Leu | Ala | Thr | Gly | Pro | Leu | Trp | Gly | Leu | Val | Arg | Ser | Ala |
| | 2355 | | | | | | 2360 | | | | | 2365 | | | |
| Gln | Ser | Glu | Asn | Pro | Gly | Arg | Leu | Phe | Leu | Leu | Asp | Leu | Gly | Glu | Gly |
| | 2370 | | | | | 2375 | | | | | 2380 | | | | |
| Glu | Gly | Glu | Arg | Asp | Gly | Ala | Glu | Glu | Leu | Ile | Arg | Ala | Ala | Thr | Ala |
| 2385 | | | | | 2390 | | | | | 2395 | | | | | 2400 |
| Gly | Asp | Glu | Pro | Gln | Leu | Ala | Ala | Arg | Asp | Gly | Arg | Leu | Leu | Ala | Pro |
| | | | 2405 | | | | | | 2410 | | | | | 2415 | |
| Arg | Leu | Ala | Arg | Thr | Ala | Ala | Leu | Ser | Ser | Glu | Asp | Thr | Ala | Gly | Gly |
| | | | 2420 | | | | | 2425 | | | | | 2430 | | |
| Ala | Asp | Arg | Phe | Gly | Pro | Asp | Gly | Thr | Val | Leu | Val | Thr | Gly | Gly | Thr |
| | 2435 | | | | | | 2440 | | | | | 2445 | | | |
| Gly | Gly | Leu | Gly | Ala | Leu | Leu | Ala | Arg | His | Leu | Val | Glu | Arg | His | Gly |
| | 2450 | | | | | 2455 | | | | | 2460 | | | | |
| Val | Arg | Arg | Leu | Leu | Leu | Val | Ser | Arg | Arg | Gly | Ala | Asp | Ala | Pro | Gly |
| 2465 | | | | | 2470 | | | | | 2475 | | | | | 2480 |
| Ala | Ala | Asp | Leu | Gly | Glu | Asp | Leu | Ala | Gly | Leu | Gly | Ala | Glu | Val | Ala |
| | | | 2485 | | | | | | 2490 | | | | | 2495 | |
| Phe | Ala | Ala | Ala | Asp | Ala | Ala | Asp | Arg | Glu | Ser | Leu | Ala | Arg | Ala | Ile |
| | | | 2500 | | | | | 2505 | | | | | 2510 | | |
| Ala | Thr | Val | Pro | Ala | Glu | His | Pro | Leu | Thr | Ala | Val | Val | His | Thr | Ala |
| | 2515 | | | | | | 2520 | | | | | 2525 | | | |
| Gly | Val | Val | Asp | Asp | Ala | Thr | Val | Glu | Ala | Leu | Thr | Pro | Glu | Arg | Leu |
| | 2530 | | | | | 2535 | | | | | 2540 | | | | |
| Asp | Ala | Val | Leu | Arg | Pro | Lys | Val | Asp | Ala | Ala | Trp | Asn | Leu | His | Glu |
| 2545 | | | | | 2550 | | | | | 2555 | | | | | 2560 |

Leu Thr Lys Asp Leu Arg Leu Asp Ala Phe Val Leu Phe Ser Ser Val
 2565 2570 2575
 Ser Gly Ile Val Gly Thr Ala Gly Gln Ala Asn Tyr Ala Ala Ala Asn
 2580 2585 2590
 Thr Gly Leu Asp Ala Leu Ala Ala His Arg Ala Ala Thr Gly Leu Ala
 2595 2600 2605
 Ala Thr Ser Leu Ala Trp Gly Leu Trp Asp Gly Thr His Gly Met Gly
 2610 2615 2620
 Gly Thr Leu Gly Ala Ala Asp Leu Ala Arg Trp Ser Arg Ala Gly Ile
 2625 2630 2635 2640
 Thr Pro Leu Thr Pro Leu Gln Gly Leu Ala Leu Phe Asp Ala Ala Val
 2645 2650 2655
 Ala Arg Asp Asp Ala Leu Leu Val Pro Ala Gly Leu Arg Pro Thr Ala
 2660 2665 2670
 His Arg Gly Thr Asp Gly Gln Pro Pro Ala Leu Trp Arg Gly Leu Val
 2675 2680 2685
 Arg Ala Arg Pro Arg Arg Ala Ala Arg Thr Ala Ala Glu Ala Ala Asp
 2690 2695 2700
 Thr Thr Gly Gly Trp Leu Ser Gly Leu Ala Ala Gln Ser Pro Glu Glu
 2705 2710 2715 2720
 Arg Arg Ser Thr Ala Val Thr Leu Val Thr Gly Val Val Ala Asp Val
 2725 2730 2735
 Leu Gly His Ala Asp Ser Ala Ala Val Gly Ala Glu Arg Ser Phe Lys
 2740 2745 2750
 Asp Leu Gly Phe Asp Ser Leu Ala Gly Val Glu Leu Arg Asn Arg Leu
 2755 2760 2765
 Asn Ala Ala Thr Gly Leu Arg Leu Pro Ala Thr Thr Val Phe Asp His
 2770 2775 2780
 Pro Ser Pro Ala Ala Leu Ala Ser His Leu Leu Ala Gln Val Pro Gly
 2785 2790 2795 2800
 Leu Lys Glu Gly Thr Ala Ala Thr Ala Thr Val Val Ala Glu Arg Gly
 2805 2810 2815
 Ala Ser Phe Gly Asp Arg Ala Thr Asp Asp Asp Pro Ile Ala Ile Val
 2820 2825 2830
 Gly Met Ala Cys Arg Tyr Pro Gly Gly Val Ser Ser Pro Glu Asp Leu
 2835 2840 2845
 Trp Arg Leu Val Ala Glu Gly Thr Asp Ala Ile Ser Glu Phe Pro Val
 2850 2855 2860
 Asn Arg Gly Trp Asp Leu Glu Ser Leu Tyr Asp Pro Asp Pro Glu Ser
 2865 2870 2875 2880
 Lys Gly Thr Thr Tyr Cys Arg Glu Gly Gly Phe Leu Glu Gly Ala Gly
 2885 2890 2895
 Asp Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Val
 2900 2905 2910
 Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Val Ser Trp Glu Ala Leu
 2915 2920 2925
 Glu Arg Ala Gly Ile Asp Pro Ser Ser Leu Arg Gly Ser Arg Gly Gly
 2930 2935 2940
 Val Tyr Val Gly Ala Ala His Gly Ser Tyr Ala Ser Asp Pro Arg Leu
 2945 2950 2955 2960
 Val Pro Glu Gly Ser Glu Gly Tyr Leu Leu Thr Gly Ser Ala Asp Ala
 2965 2970 2975
 Val Met Ser Gly Arg Ile Ser Tyr Ala Leu Gly Leu Glu Gly Pro Ser
 2980 2985 2990
 Met Thr Val Glu Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu
 2995 3000 3005
 Ala Val Arg Ala Leu Arg His Gly Glu Cys Gly Leu Ala Leu Ala Gly
 3010 3015 3020
 Gly Val Ala Val Met Ala Asp Pro Ala Ala Phe Val Glu Phe Ser Arg
 3025 3030 3035 3040
 Gln Lys Gly Leu Ala Ala Asp Gly Arg Cys Lys Ala Phe Ser Ala Ala
 3045 3050 3055

Ala Asp Gly Thr Gly Trp Ala Glu Gly Val Gly Val Leu Val Leu Glu
 3060 3065 3070
 Arg Leu Ser Asp Ala Arg Arg Ala Gly His Thr Val Leu Gly Leu Val
 3075 3080 3085
 Thr Gly Thr Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala
 3090 3095 3100
 Pro Asn Gly Pro Ala Gln Gln Arg Val Ile Ala Glu Ala Leu Ala Asp
 3105 3110 3115 3120
 Ala Gly Leu Ser Pro Glu Asp Val Asp Ala Val Glu Ala His Gly Thr
 3125 3130 3135
 Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gly Ala Leu Leu Ala Ala
 3140 3145 3150
 Ser Gly Arg Asn Arg Ser Gly Asp His Pro Leu Trp Leu Gly Ser Leu
 3155 3160 3165
 Lys Ser Asn Ile Gly His Ala Gln Ala Ala Ala Gly Val Gly Gly Val
 3170 3175 3180
 Ile Lys Met Leu Gln Ala Leu Arg His Gly Leu Leu Pro Arg Thr Leu
 3185 3190 3195 3200
 His Ala Asp Glu Pro Thr Pro His Ala Asp Trp Ser Ser Gly Arg Val
 3205 3210 3215
 Arg Leu Leu Thr Ser Glu Val Pro Trp Gln Arg Thr Gly Arg Pro Arg
 3220 3225 3230
 Arg Thr Gly Val Ser Ala Phe Gly Val Gly Gly Thr Asn Ala His Val
 3235 3240 3245
 Val Leu Glu Glu Ala Pro Ala Pro Pro Ala Pro Glu Pro Ala Gly Glu
 3250 3255 3260
 Ala Pro Gly Gly Ser Arg Ala Ala Glu Gly Ala Glu Gly Pro Leu Ala
 3265 3270 3275 3280
 Trp Val Val Ser Gly Arg Asp Glu Pro Ala Leu Arg Ser Gln Ala Arg
 3285 3290 3295
 Arg Leu Arg Asp His Leu Ser Arg Thr Pro Gly Ala Arg Pro Arg Asp
 3300 3305 3310
 Ile Ala Phe Ser Leu Ala Ala Thr Arg Ala Ala Phe Asp His Arg Ala
 3315 3320 3325
 Val Leu Ile Gly Ser Asp Gly Ala Glu Leu Ala Ala Ala Leu Asp Ala
 3330 3335 3340
 Leu Ala Glu Gly Arg Asp Gly Pro Ala Val Val Arg Gly Val Arg Asp
 3345 3350 3355 3360
 Arg Asp Gly Arg Met Ala Phe Leu Phe Thr Gly Gln Gly Ser Gln Arg
 3365 3370 3375
 Ala Gly Met Ala His Asp Leu His Ala Ala His Thr Phe Phe Ala Ser
 3380 3385 3390
 Ala Leu Asp Glu Val Thr Asp Arg Leu Asp Pro Leu Leu Gly Arg Pro
 3395 3400 3405
 Leu Gly Ala Leu Leu Asp Ala Arg Pro Gly Ser Pro Glu Ala Ala Leu
 3410 3415 3420
 Leu Asp Arg Thr Glu Tyr Thr Gln Pro Ala Leu Phe Ala Val Glu Val
 3425 3430 3435 3440
 Ala Leu His Arg Leu Leu Glu His Trp Gly Met Arg Pro Asp Leu Leu
 3445 3450 3455
 Leu Gly His Ser Val Gly Glu Leu Ala Ala Ala His Val Ala Gly Val
 3460 3465 3470
 Leu Asp Leu Asp Asp Ala Cys Ala Leu Val Ala Ala Arg Gly Arg Leu
 3475 3480 3485
 Met Gln Arg Leu Pro Pro Gly Gly Ala Met Val Ser Val Arg Ala Gly
 3490 3495 3500
 Glu Asp Glu Val Arg Ala Leu Leu Ala Gly Arg Glu Asp Ala Val Cys
 3505 3510 3515 3520
 Val Ala Ala Val Asn Gly Pro Arg Ser Val Val Ile Ser Gly Ala Glu
 3525 3530 3535
 Glu Ala Val Ala Glu Ala Ala Ala Gln Leu Ala Gly Arg Gly Arg Arg
 3540 3545 3550

| | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Thr | Arg | Arg | Leu | Arg | Val | Ala | His | Ala | Phe | His | Ser | Pro | Leu | Met | Asp |
| | | 3555 | | | | | 3560 | | | | | 3565 | | | |
| Gly | Met | Leu | Ala | Gly | Phe | Arg | Glu | Val | Ala | Ala | Gly | Leu | Arg | Tyr | Arg |
| | 3570 | | | | | 3575 | | | | | 3580 | | | | |
| Glu | Pro | Glu | Leu | Thr | Val | Val | Ser | Thr | Val | Thr | Gly | Arg | Pro | Ala | Arg |
| 3585 | | | | | 3590 | | | | | 3595 | | | | | 3600 |
| Pro | Gly | Glu | Leu | Thr | Gly | Pro | Asp | Tyr | Trp | Val | Ala | Gln | Val | Arg | Glu |
| | | | | 3605 | | | | | 3610 | | | | | | 3615 |
| Pro | Val | Arg | Phe | Ala | Asp | Ala | Val | Arg | Thr | Ala | His | Arg | Leu | Gly | Ala |
| | | | 3620 | | | | | 3625 | | | | | 3630 | | |
| Arg | Thr | Phe | Leu | Glu | Thr | Gly | Pro | Asp | Gly | Val | Leu | Cys | Gly | Met | Ala |
| | | 3635 | | | | | 3640 | | | | | 3645 | | | |
| Glu | Glu | Cys | Leu | Glu | Asp | Asp | Thr | Val | Ala | Leu | Leu | Pro | Ala | Ile | His |
| | 3650 | | | | | 3655 | | | | | 3660 | | | | |
| Lys | Pro | Gly | Thr | Ala | Pro | His | Gly | Pro | Ala | Ala | Pro | Gly | Ala | Leu | Arg |
| 3665 | | | | | 3670 | | | | | 3675 | | | | | 3680 |
| Ala | Ala | Ala | Ala | Ala | Tyr | Gly | Arg | Gly | Ala | Arg | Val | Asp | Trp | Ala | Gly |
| | | | | 3685 | | | | | 3690 | | | | | | 3695 |
| Met | His | Ala | Asp | Gly | Pro | Glu | Gly | Pro | Ala | Arg | Arg | Val | Glu | Leu | Pro |
| | | | 3700 | | | | | 3705 | | | | | 3710 | | |
| Val | His | Ala | Phe | Arg | His | Arg | Arg | Tyr | Trp | Leu | Ala | Pro | Gly | Arg | Ala |
| | | 3715 | | | | | 3720 | | | | | 3725 | | | |
| Ala | Asp | Thr | Asp | Asp | Trp | Met | Tyr | Arg | Ile | Gly | Trp | Asp | Arg | Leu | Pro |
| | 3730 | | | | | 3735 | | | | | 3740 | | | | |
| Ala | Val | Thr | Gly | Gly | Ala | Arg | Thr | Ala | Gly | Arg | Trp | Leu | Val | Ile | His |
| 3745 | | | | | 3750 | | | | | 3755 | | | | | 3760 |
| Pro | Asp | Ser | Pro | Arg | Cys | Arg | Glu | Leu | Ser | Gly | His | Ala | Glu | Arg | Ala |
| | | | | 3765 | | | | | 3770 | | | | | | 3775 |
| Leu | Arg | Ala | Ala | Gly | Ala | Ser | Pro | Val | Pro | Leu | Pro | Val | Asp | Ala | Pro |
| | | | 3780 | | | | | 3785 | | | | | 3790 | | |
| Ala | Ala | Asp | Arg | Ala | Ser | Phe | Ala | Ala | Leu | Leu | Arg | Ser | Ala | Thr | Gly |
| | | 3795 | | | | | 3800 | | | | | 3805 | | | |
| Pro | Asp | Thr | Arg | Gly | Asp | Thr | Ala | Ala | Pro | Val | Ala | Gly | Val | Leu | Ser |
| | 3810 | | | | | 3815 | | | | | 3820 | | | | |
| Leu | Leu | Ser | Glu | Glu | Asp | Arg | Pro | His | Arg | Gln | His | Ala | Pro | Val | Pro |
| 3825 | | | | | 3830 | | | | | 3835 | | | | | 3840 |
| Ala | Gly | Val | Leu | Ala | Thr | Leu | Ser | Leu | Met | Gln | Ala | Met | Glu | Glu | Glu |
| | | | 3845 | | | | | | 3850 | | | | | 3855 | |
| Ala | Val | Glu | Ala | Arg | Val | Trp | Cys | Val | Ser | Arg | Ala | Ala | Val | Ala | Ala |
| | | 3860 | | | | | | 3865 | | | | | 3870 | | |
| Ala | Asp | Arg | Glu | Arg | Pro | Val | Gly | Ala | Gly | Ala | Ala | Leu | Trp | Gly | Leu |
| | 3875 | | | | | | 3880 | | | | | 3885 | | | |
| Gly | Arg | Val | Ala | Ala | Leu | Glu | Arg | Pro | Thr | Arg | Trp | Gly | Gly | Leu | Val |
| | 3890 | | | | | 3895 | | | | | 3900 | | | | |
| Asp | Leu | Pro | Ala | Ser | Pro | Gly | Ala | Ala | His | Trp | Ala | Ala | Ala | Val | Glu |
| 3905 | | | | | 3910 | | | | | 3915 | | | | | 3920 |
| Arg | Leu | Ala | Gly | Pro | Glu | Asp | Gln | Ile | Ala | Val | Arg | Ala | Ser | Gly | Ser |
| | | | | 3925 | | | | | 3930 | | | | | 3935 | |
| Trp | Gly | Arg | Arg | Leu | Thr | Arg | Leu | Pro | Arg | Asp | Gly | Gly | Gly | Arg | Thr |
| | | | 3940 | | | | | 3945 | | | | | 3950 | | |
| Ala | Ala | Pro | Ala | Tyr | Arg | Pro | Arg | Gly | Thr | Val | Leu | Val | Thr | Gly | Gly |
| | | 3955 | | | | | 3960 | | | | | 3965 | | | |
| Thr | Gly | Ala | Leu | Gly | Gly | His | Leu | Ala | Arg | Trp | Leu | Ala | Ala | Ala | Gly |
| | 3970 | | | | | 3975 | | | | | 3980 | | | | |
| Ala | Glu | His | Leu | Ala | Leu | Thr | Ser | Arg | Arg | Gly | Pro | Asp | Ala | Pro | Gly |
| 3985 | | | | | 3990 | | | | | 3995 | | | | | 4000 |
| Ala | Ala | Gly | Leu | Glu | Ala | Glu | Leu | Leu | Leu | Gly | Ala | Lys | Val | Thr | |
| | | | 4005 | | | | | | 4010 | | | | 4015 | | |
| Phe | Ala | Ala | Cys | Asp | Thr | Ala | Asp | Arg | Asp | Gly | Leu | Ala | Arg | Val | Leu |
| | | | 4020 | | | | | 4025 | | | | | 4030 | | |
| Arg | Ala | Ile | Pro | Glu | Asp | Thr | Pro | Leu | Thr | Ala | Val | Phe | His | Ala | Ala |
| | 4035 | | | | | | 4040 | | | | | | 4045 | | |

| | | | | | | | | | | | | | | | |
|------|-----|-----|-----|------|-----|------|------|------|------|-----|------|------|------|------|------|
| Gly | Val | Pro | Gln | Val | Thr | Pro | Leu | Ser | Arg | Thr | Ser | Pro | Glu | His | Phe |
| 4050 | | | | | | 4055 | | | | | 4060 | | | | |
| Ala | Asp | Val | Tyr | Ala | Gly | Lys | Ala | Ala | Gly | Ala | Ala | His | Leu | Asp | Glu |
| 4065 | | | | | | 4070 | | | | | 4075 | | | | 4080 |
| Leu | Thr | Arg | Glu | Leu | Gly | Ala | Gly | Leu | Asp | Ala | Phe | Val | Leu | Tyr | Ser |
| | | | | 4085 | | | | | 4090 | | | | | 4095 | |
| Ser | Gly | Ala | Gly | Val | Trp | Gly | Ser | Ala | Gly | Gln | Gly | Ala | Tyr | Ala | Ala |
| | | | | 4100 | | | | 4105 | | | | | 4110 | | |
| Ala | Asn | Ala | Ala | Leu | Asp | Ala | Leu | Ala | Arg | Arg | Arg | Ala | Ala | Asp | Gly |
| | | | | 4115 | | | | 4120 | | | | | 4125 | | |
| Leu | Pro | Ala | Thr | Ser | Ile | Ala | Trp | Gly | Val | Trp | Gly | Gly | Gly | Gly | Met |
| | | | | 4130 | | | | 4135 | | | | | 4140 | | |
| Gly | Ala | Asp | Glu | Ala | Gly | Ala | Glu | Tyr | Leu | Gly | Arg | Arg | Gly | Met | Arg |
| 4145 | | | | | | 4150 | | | | | 4155 | | | | 4160 |
| Pro | Met | Ala | Pro | Val | Ser | Ala | Leu | Arg | Ala | Met | Ala | Thr | Ala | Ile | Ala |
| | | | | 4165 | | | | | 4170 | | | | | 4175 | |
| Ser | Gly | Glu | Pro | Cys | Pro | Thr | Val | Thr | His | Thr | Asp | Trp | Glu | Arg | Phe |
| | | | | 4180 | | | | | 4185 | | | | 4190 | | |
| Gly | Glu | Gly | Phe | Thr | Ala | Phe | Arg | Pro | Ser | Pro | Leu | Ile | Ala | Gly | Leu |
| | | | | 4195 | | | | 4200 | | | | | 4205 | | |
| Gly | Thr | Pro | Gly | Gly | Gly | Arg | Ala | Ala | Glu | Thr | Pro | Glu | Glu | Gly | Asn |
| | | | | 4210 | | | | 4215 | | | | | 4220 | | |
| Ala | Thr | Ala | Ala | Ala | Asp | Leu | Thr | Ala | Leu | Pro | Pro | Ala | Glu | Leu | Arg |
| 4225 | | | | | | 4230 | | | | | 4235 | | | | 4240 |
| Thr | Ala | Leu | Arg | Glu | Leu | Val | Arg | Ala | Arg | Thr | Ala | Ala | Ala | Leu | Gly |
| | | | | 4245 | | | | | 4250 | | | | | 4255 | |
| Leu | Asp | Asp | Pro | Ala | Glu | Val | Ala | Glu | Gly | Glu | Arg | Phe | Pro | Ala | Met |
| | | | | 4260 | | | | | 4265 | | | | | 4270 | |
| Gly | Phe | Asp | Ser | Leu | Ala | Thr | Val | Arg | Leu | Arg | Arg | Gly | Leu | Ala | Ser |
| | | | | 4275 | | | | 4280 | | | | | 4285 | | |
| Ala | Thr | Gly | Leu | Asp | Leu | Pro | Pro | Asp | Leu | Leu | Phe | Asp | Arg | Asp | Thr |
| | | | | 4290 | | | | 4295 | | | | 4300 | | | |
| Pro | Ala | Ala | Leu | Ala | Ala | His | Leu | Ala | Glu | Leu | Leu | Ala | Thr | Ala | Arg |
| 4305 | | | | | | 4310 | | | | | 4315 | | | | 4320 |
| Asp | His | Gly | Pro | Gly | Gly | Pro | Gly | Thr | Gly | Ala | Ala | Pro | Ala | Asp | Ala |
| | | | | 4325 | | | | | 4330 | | | | | 4335 | |
| Gly | Ser | Gly | Leu | Pro | Ala | Leu | Tyr | Arg | Glu | Ala | Val | Arg | Thr | Gly | Arg |
| | | | | 4340 | | | | 4345 | | | | | 4350 | | |
| Ala | Ala | Glu | Met | Ala | Glu | Leu | Leu | Ala | Ala | Ala | Ser | Arg | Phe | Arg | Pro |
| | | | | 4355 | | | | 4360 | | | | | 4365 | | |
| Ala | Phe | Gly | Thr | Ala | Asp | Arg | Gln | Pro | Val | Ala | Leu | Val | Pro | Leu | Ala |
| | | | | 4370 | | | | 4375 | | | | 4380 | | | |
| Asp | Gly | Ala | Glu | Asp | Thr | Gly | Leu | Pro | Leu | Leu | Val | Gly | Cys | Ala | Gly |
| 4385 | | | | | | 4390 | | | | | 4395 | | | | 4400 |
| Thr | Ala | Val | Ala | Ser | Gly | Pro | Val | Glu | Phe | Thr | Ala | Phe | Ala | Gly | Ala |
| | | | | 4405 | | | | | 4410 | | | | | 4415 | |
| Leu | Ala | Asp | Leu | Pro | Ala | Ala | Ala | Pro | Met | Ala | Ala | Leu | Pro | Gln | Pro |
| | | | | 4420 | | | | 4425 | | | | | 4430 | | |
| Gly | Phe | Leu | Pro | Gly | Glu | Arg | Val | Pro | Ala | Thr | Pro | Glu | Ala | Leu | Phe |
| | | | | 4435 | | | | 4440 | | | | 4445 | | | |
| Glu | Ala | Gln | Ala | Glu | Ala | Leu | Leu | Arg | Tyr | Ala | Ala | Gly | Arg | Pro | Phe |
| | | | | 4450 | | | | 4455 | | | | 4460 | | | |
| Val | Leu | Leu | Gly | His | Ser | Ala | Gly | Ala | Asn | Met | Ala | His | Ala | Leu | Thr |
| 4465 | | | | | | 4470 | | | | | 4475 | | | | 4480 |
| Arg | His | Leu | Glu | Ala | Asn | Gly | Gly | Gly | Pro | Ala | Gly | Leu | Val | Leu | Met |
| | | | | 4485 | | | | | 4490 | | | | | 4495 | |
| Asp | Ile | Tyr | Thr | Pro | Ala | Asp | Pro | Gly | Ala | Met | Gly | Val | Trp | Arg | Asn |
| | | | | 4500 | | | | 4505 | | | | | 4510 | | |
| Asp | Met | Phe | Gln | Trp | Val | Trp | Arg | Arg | Ser | Asp | Ile | Pro | Pro | Asp | Asp |
| | | | | 4515 | | | | 4520 | | | | 4525 | | | |
| His | Arg | Leu | Thr | Ala | Met | Gly | Ala | Tyr | His | Arg | Leu | Leu | Leu | Asp | Trp |
| | | | | 4530 | | | 4535 | | | | 4540 | | | | |

Ser Pro Thr Pro Val Arg Ala Pro Val Leu His Leu Arg Ala Ala Glu
 4545 4550 4555 4560
 Pro Met Gly Asp Trp Pro Pro Gly Asp Thr Gly Trp Gln Ser His Trp
 4565 4570 4575
 Asp Gly Ala His Thr Thr Ala Gly Ile Pro Gly Asn His Phe Thr Met
 4580 4585 4590
 Met Thr Glu His Ala Ser Ala Ala Ala Arg Leu Val His Gly Trp Leu
 4595 4600 4605
 Ala Glu Arg Thr Pro Ser Gly Gln Gly Gly Ser Pro Ser Arg Ala Ala
 4610 4615 4620
 Gly Arg Glu Glu Arg Pro
 4625 4630

<210> 3
 <211> 13613
 <212> DNA
 <213> Streptomyces venezuelae

<400> 3
 ggatccggcg cttccacccc gcgccgaaca gcgcgggtgcg gctgggtctgc ctgccgcacg 60
 ccggcggtc cgccagctac ttcttccgct tctcggagga gctgcacccc tccgtcgagg 120
 ccctgtcggg gcagtatccg ggccgccagg accggcggtgc cgagccgtgt ctggagagcg 180
 tcgaggagct cgccgagcat gtggtcgcgg ccaccgaacc ctggtggcag gagggccggc 240
 tggccttctt cgggcacagc ctcggcgcct ccgtcgcctt cgagacggcc cgcctcctgg 300
 aacagcggca cggggtacgg cccgagggcc tgtacgtctc cggtcggcgc gcccgcctgc 360
 tggcgccgga ccggctcgtc caccagctgg acgaccgggc gttcctggcc gagatccggc 420
 ggctcagcgg caccgacgag cggttcctcc aggacgacga gctgctgcgg ctgggtgctgc 480
 ccgcgtgcg cagcgactac aaggcggcgg agacgtacct gcaccggccg tccgccaagc 540
 tcacctgccc ggtgatggcc ctggccggcg accgtgacct gaaggcgccg ctgaacgagg 600
 tggccgagtg gcgtcggcac accagcgggc cgttctgcct ccgggcgtac tccggcgcc 660
 acttctacct caacgaccag tggcacgaga tctgcaacga catctccgac cacctgctcg 720
 tcaccgcggc cgcccccgat gcccgcgtcg tgcagcccc gaccagcctt atcgaaggag 780
 cggcgaagag atggcagaac ccacggtgac cgacgacctg acggggggccc tcacgcagcc 840
 cccgctgggc cgcaccgtcc gcgcggtggc cgaccgtgaa ctccggcacc acctcctgga 900
 gaccgcggc atccactgga tccacgccgc gaacggcgac ccgtacgcca ccgtgctgcg 960
 cggccaggcg gacgacctgt atccccgcta cgagcgggtg cgtgcccgcg gcgcgtctc 1020
 cttcagcccc acgggcagct gggtcaccgc cgatcacgcc ctggcggcga gcctcctctg 1080
 ctgcagcgac ttcgggggtc ccggcgccga cggcgtccc gtgccgcagc aggtcctctc 1140
 gtacggggag ggtgttccgc tggagcgaga gcaggtgctg ccggcgggcc gtgacgtgcc 1200
 ggagggcggg cagcgtgccg tggtcgaggg gatccaccgg gagacgtgg agggctctcg 1260
 gccggacccg tcggcgtcgt acgccttcga gctgctgggc ggtttcgtcc gcccgcggt 1320
 gacggccgct gccgcgccg tgcgtgggtgt tcccgcggac cggcgcgcg acttcgcgga 1380
 tctgctggag cggctccggc cgctgtccga cagcctgctg gccccgcagt ccctgcggac 1440
 ggtacgggcg gcggacggcg cgctggccga gctcacggcg ctgctcgccg attcggacga 1500
 ctccccggg gccctgctgt cggcgctcgg ggtcacgca gccgtccagc tcaccgggaa 1560
 cgcggtgct gcgctcctc cgcatcccga gcagtggcgg gagctgtgc accggcccgg 1620
 gctcgcggcg gccgcggtg aggagaccct ccgtacgac ccgccggtgc agctcgacgc 1680
 ccgggtggtc cgcggggaga cggagctggc gggccggcg ctgccggccg gggcgcatgt 1740
 cgtcgtcctg accgccgcga ccggccggga ccggaggctc ttcacggacc cggagcgctt 1800
 cgacctcgcg cgccccgacg ccgcgcgca cctcgcgctg caccgcccg gtccgtacgg 1860
 cccggtggcg tccctgggtc ggcttcaggc ggaggtcgc ctgcggacct tggccggcg 1920
 tttccccggg ctgcggcagg cgggggacgt gctccgcccc cgccgcgcgc ctgtcggccg 1980
 cgggcccgtg agcgtcccgg tcagcagctc ctgagacacc ggggccccgg tccgcccggc 2040
 ccccttcgg acggaccgga cggctcggac cacggggacg gctcagaccg tcccgtgtgt 2100
 ccccgctcgg ctcccgtccg ccccatcccc cccctccacc ggcaaggaa gacacgacgc 2160
 catgcgcgtc ctgctgacct cgttcgcaca tcacacgcac tactacggcc tgggtgccct 2220
 ggcttggggc ctgctcgccg ccgggcacga ggtgcccgtc gccagccagc ccgcgctcac 2280
 ggacaccatc accgggtccg ggctcgcgcg ggtgccggtc ggcaccgacc acctcatcca 2340
 cgagtaccgg gtgcggatgg cgggcgagcc gcgcccgaac catccggcga tcgccttcga 2400
 cgaggcccggt cccgagccgc tggactggga ccacgccctc ggcatcgagg cgatcctcgc 2460
 cccgtacttc catctgctcg ccaacaacga ctcgatggtc gacgacctcg tcgacttcgc 2520
 ccggtcctgg cagccggacc tgggtgctgt ggagccgacg acctacgcgg gcgccgtcgc 2580

| | | | | | | |
|-------------|------------|-------------|-------------|-------------|-------------|------|
| cgcccaggtc | accggtgccg | cgcacgcccg | ggctcctgtgg | gggcccgcag | tgatgggcag | 2640 |
| cgcccgcgcg | aagttcgtcg | cgctgcggga | ccggcagccg | cccagagcacc | gcgaggaccc | 2700 |
| caccgcggag | tggttgacgt | ggacgctcga | ccggtacggc | gcctccttcg | aagaggagct | 2760 |
| gctcacccgc | cagttcacga | tcgaccgcag | cccgcgcagc | ctgcgcctcg | acacgggctt | 2820 |
| gccgaccgtc | gggatgcgtt | atgttccgta | caacggcacg | tcggtcgtgc | cggactggct | 2880 |
| gagtgcgcgc | cccgcgcggc | cccgggtctg | cctgaccctc | ggcgtctccg | cgcgtagggt | 2940 |
| cctcggcggc | gacggcgtct | cgcagggcga | catcctggag | gcgctcgccg | acctcgacat | 3000 |
| cgagctcgtc | gccacgctcg | acgcgagtcg | gcgcgcgcag | atccgcaact | acccgaagca | 3060 |
| caccgcgttc | acggacttcg | tgccgatgca | cgcgctcctg | ccgagctgct | cggcgatcat | 3120 |
| ccaccacggc | ggggcgggca | cctacgcgac | cgccgtgatc | aacgcggtgc | cgcaggatcat | 3180 |
| gctcgcgcgag | ctgtgggacg | cgccgggtcaa | ggcgcggggc | gtcgcgcgagc | agggggcggg | 3240 |
| gttcttctcg | ccgcgcggcg | agctcacggc | gcaggccgtg | cgggacgcgc | tcgtccgcac | 3300 |
| cctcgacgac | ccctcggtcg | ccaccgcgcg | ccaccggctg | cgcgaggaga | ccttcggcga | 3360 |
| ccccaccccg | gccgggatcg | tccccgagct | ggagcggctc | gccgcgcgagc | accgcgcgcc | 3420 |
| gccggccgac | gcccggcact | gagccgcacc | cctcgcccca | ggcctcacc | ctgtatctgc | 3480 |
| gccgggggac | gcccccgcc | caccctccga | aagaccgaaa | gcaggagcac | cgtgtacgaa | 3540 |
| gtcgaccacg | ccgacgtcta | cgacctcttc | tacctgggtc | gcggcaagga | ctacgcgcgc | 3600 |
| gaggcctccg | acatcgccga | cctggtgcgc | tcccgatccc | ccgaggcctc | ctcgctcctg | 3660 |
| gacgtggcct | gcggtacggg | cacgcactctg | gagcacttca | ccaaggagtt | cggcgacacc | 3720 |
| gccggccttg | agctgtccga | ggacatgctc | acccacgccc | gcaagcgggt | gcccgcgcgc | 3780 |
| acgtctccac | agggcgacat | gcgggacttc | cggctcggcc | ggaagtcttc | cgccgtggct | 3840 |
| agcatgttca | gttccgtcgg | ctacctgaag | acgaccgagg | aactcggcgc | ggccgtgcgc | 3900 |
| tcgttcgcgg | agcacctgga | gcccgggtgg | gtcgtcgtcg | tcgagccgtg | gtggttcccg | 3960 |
| gagaccttcg | ccgacggctg | ggtcagcgcc | gacgtcgtcc | gccgtgacgg | gcgcaccgtg | 4020 |
| gcccgtgtct | cgcactcggt | gcgggagggg | aacgcgacgc | gcatggaggt | ccacttcacc | 4080 |
| gtggccgacc | cgggcaaggg | cgtgcggcac | ttctccgacg | tccatctcat | caccctgttc | 4140 |
| caccaggccg | agtacaggc | cgcgttcacg | gccgcgcggc | tgccgcgtcg | gtacctggag | 4200 |
| ggcggcccgt | cgggcgcgtg | cctcttcgtc | ggcgtccccg | cctgagcacc | gcccgaagacc | 4260 |
| ccccggggcg | ggagtcctcg | gggtgcaccaa | gcaaagagag | agaaacgaac | cgtgacaggt | 4320 |
| aagaccgcga | taccgcgtgt | ccgcgcgcgc | cgcaccacgc | ccagggcctt | caccctggcc | 4380 |
| gtcgtcggca | ccctgctggc | gggcaccacc | gtggcggccg | ccgctcccgg | cgccgcgcgac | 4440 |
| acggccaatg | ttcagtagac | gagccggggc | gcggagctcg | tcgcccagat | gacgtcgcac | 4500 |
| gagaagatca | gcttcgtcca | ctgggcgctg | gaccccgacc | ggcagaacgt | cggctacctt | 4560 |
| cccggcgtgc | cgcgtctggg | catcccggag | ctgcgtgccg | ccgacggccc | gaacggcatc | 4620 |
| cgcttgggtg | ggcagaccgc | caccgcgctg | cccgcgcgcg | tcgcccgtgg | cagcaccttc | 4680 |
| gacgacacca | tgcccgacag | ctacggcaag | gtcatggggc | gcgacggctc | cgcgctcaac | 4740 |
| caggacatgg | tcctggggcc | gatgatgaac | aacatccggg | tgccgcacgg | cggccggaac | 4800 |
| tacgagacct | tcagcgagga | ccccctggct | tcctcgcgca | ccgcggtcgc | ccagatcaag | 4860 |
| ggcatccagg | gtgcgggtct | gatgaccacg | gccaaagcact | tcgcggccaa | caaccaggag | 4920 |
| aacaaccgct | tctccgtgaa | cgccaatgtc | gacgagcaga | cgctccgcga | gatcgagttc | 4980 |
| ccggcgcttc | aggcgctctc | caaggccggc | gcggcctcct | tcagtgtgtc | ctacaacggc | 5040 |
| ctcaacggga | agccgtcctg | cggcaacgac | gagctcctca | acaacgtgct | gcgcacgcag | 5100 |
| tggggcttcc | agggtcgggt | gatgtccgac | tggttcgccg | ccccgggcac | cgacgccatc | 5160 |
| accaagggcc | tcgaccagga | gatgggcgtc | gagctccccg | gcgacgtccc | gaagggcgag | 5220 |
| ccctcgccgc | cggccaagtt | cttcggcgag | gcgctgaaga | cggccgtcct | gaacggcacg | 5280 |
| gtccccgagg | cggccgtgac | gcggtcggcg | gagcggatcg | tcggccagat | ggagaagttc | 5340 |
| ggtctgctcc | tcgccactcc | ggcgcgcgcg | cccagcgcgc | acaaggcggg | tgcccaggcg | 5400 |
| gtgtcccgcg | aggtcgcgcg | gaacggcgcg | gtgctctcgc | gcaacgaggg | ccaggccctg | 5460 |
| ccgctcgcgc | gtgacgcgcg | caagagcatc | gcggtcatcg | gcccgcgcgc | cgtcgacccc | 5520 |
| aaggtcaccg | gcctgggcag | cgcacacgtc | gtcccggaact | cggcggcggc | gccactcgac | 5580 |
| accatcaagg | cccgcgcggg | tgccgggtgc | acggtgacgt | acgagacggg | tgaggagacc | 5640 |
| ttcgggacgc | agatcccggc | ggggaacctc | agcccggcgt | tcaaccaggg | ccaccagctc | 5700 |
| gagccgggca | aggcgggggc | gctgtacgac | ggcacgctga | ccgtgcccgc | cgacggcgag | 5760 |
| taccgcatcg | cggctcgtgc | caccgggtgt | tacgccacgg | tcagctcgg | cagccacacc | 5820 |
| atcgaggccg | tcaggtcta | cggcaaggtg | agcagcccg | tcctcaagct | gaccaagggc | 5880 |
| acgcacaagc | tcacgatctc | gggtctcgcg | atgagtccca | ccccgctctc | cctggagctg | 5940 |
| ggctgggtga | cgcgcggcgc | ggccgacgcg | acgatgcgca | aggccgtgga | gtcggcgcg | 6000 |
| aaggcccgtg | cggcgggtcg | cttcgcctac | gacgacggca | ccgagggcgt | cgaccgtccg | 6060 |
| aacctgtcgc | tgccgggtac | gcaggacaag | ctgatctcgg | ctgtcgcgga | cgccaacccg | 6120 |
| aacacgatcg | tggtcctcaa | caccggttcg | tcggtgctga | tgccgtggct | gtccaagacc | 6180 |
| cgcgcgggtc | tggacatgtg | gtacccgggc | caggcgggcg | ccgagggcac | cgccgcgctg | 6240 |
| ctctacgggtg | acgtcaaccc | gagcggcaag | ctcacgcaga | gcttcccggc | cgccgagaac | 6300 |

| | | | | | | |
|-------------|-------------|-------------|-------------|-------------|-------------|-------|
| cagcacgcgg | tcgcgcggcg | cccgacaagc | tacccggggc | tcgacaacca | gcagacgtac | 6360 |
| cgcgagggca | tccacgtcgg | gtaccgctgg | ttcgacaagg | agaacgtcaa | gccgctgttc | 6420 |
| ccgttcgggc | acggcctgtc | gtacacctcg | ttcacgcaga | gcgccccgac | cgctcgtcgt | 6480 |
| acgtccacgg | gtggtctgaa | ggtcacggtc | acggtcgcga | acagcgggaa | gcgcgcgggc | 6540 |
| caggaggtcg | tccaggcgta | cctcgggtgcc | agcccgaacg | tgacggctcc | gcaggcgaa | 6600 |
| aagaagctcg | tgggctacac | gaaggtctcg | ctcgccgcgg | gcgaggcgaa | gacggtgacg | 6660 |
| gtgaacgtcg | accgccgtca | gctgcagacc | ggttcgtcct | ccgccgacct | gcggggcagc | 6720 |
| gccacggtea | acgtctgggt | acgtgacgcc | gtgaaagcgg | cggtgcccgc | cacccgggag | 6780 |
| ggtggcgggc | accgcttttt | cggcctgctg | ggtctaccgg | accacctgac | taggcctggt | 6840 |
| cgaccgcgtc | ggccccattcg | cgcacggcgt | cgatcacccg | cagcgccctgc | gggcgctcca | 6900 |
| ggtgcggggc | gatcggcagg | ctgaggacct | gccgcgcgaa | gctctcggcc | cgcgggagcg | 6960 |
| agccttccgg | cggtgcctcg | cccgcgtagg | cgggcgagag | gtgcacgggt | accgggtagt | 7020 |
| gcgtgagggt | gtcgatgccg | cgggcgtcga | ggtggctgcg | cagctcgtcg | cggcgctcgg | 7080 |
| tgcgcacgg | gaagaggtgc | cagaccgggt | cggtgtcggg | cgcggtcacc | ggcaggccga | 7140 |
| tgccgggcag | tccggcgagc | ccggagaggt | actccgcggc | cagcgccgac | ctgcggccgt | 7200 |
| tccagctgtc | caggtgggcg | agccggatcc | gcagcacggc | ggcctgcac | tcgtccaggc | 7260 |
| gggagttggt | gcccttcgtc | tcgtggtcgt | acttctgccg | cgagccgtag | ttgcggagca | 7320 |
| tccggagccg | ttcggcgagc | tcggggctgc | cggtgacgac | ggcgccgcgg | tcgccgaagc | 7380 |
| agccgaggtt | cttgcccggg | tagaagctga | acgeggccac | cgacgacccg | gcgccgatcc | 7440 |
| gccggccccg | gtagcgggcg | ccgtgggcct | gcgcggcgct | ctcgacgatg | tgacggccgt | 7500 |
| gccggctccg | cagctcgcgg | agggcgctca | gtgcgcggg | gtgcccgtag | aggtggacgg | 7560 |
| ggagggacgc | ccgggtgacg | gggggtatcg | ccttcctcag | gagcagcggg | tccagggtgg | 7620 |
| ggtggtcctc | gtgcggctcg | acgggcacgg | gggtcgcgcc | ggtggcgga | accgcgagcc | 7680 |
| agctggcgat | gtacgtgtgc | gaggggacga | tcacctcgtc | cccgggtccg | atgccgaggc | 7740 |
| cgcggagggc | gagctggagg | gcgtccatcc | cgctgttcac | gccgacggcg | tggtccgtct | 7800 |
| cgcagtacgc | ggcgaactcc | gcctcgaatc | cttcgagttc | gggtccgagg | aggtagcgcc | 7860 |
| ccgagtcgag | gacgcgggcg | atcgcggcgt | cggtctccgc | gcggagctcc | tcgtaggcgg | 7920 |
| ccttgaggtc | gaggaagggg | acgcgggggg | tctcggcgcg | gctgctcacg | cggacacctc | 7980 |
| catcgcggtg | gcgggcagct | gcggggcggt | cgcttgagc | ggctcccacc | agccgcgggt | 8040 |
| ctcccgggtac | acctcgtcgg | tccgcgcgag | gccctccgcg | aaggagacct | gcgggcggta | 8100 |
| gccgagctcg | cgctcgatct | cgccgcgcgt | gagggagtag | cgcaggctcg | ggcccttgcg | 8160 |
| gtcggcgacc | ttccggaccg | aggaccagtc | ggcgccgagc | gagtccagga | ggatgccggg | 8220 |
| gagttcgcgg | ttggtcagct | ccaggccgcc | gccgatgtgg | tagatctcgc | cggcccggcc | 8280 |
| gcccgcgagg | acgagcgcg | tgccccggca | gtggtcgtcg | gtgtgcaccc | actcgcgga | 8340 |
| gttcgcgcgg | tcgccgtaca | gcgggagcgt | cccgcgcgtc | aggaggttcg | tcacgaagag | 8400 |
| ggggatgagc | ttctcggggg | gctggtacgg | cccgtagttg | ttgcagcagc | gggtgatccg | 8460 |
| tacgtcgagg | ccgtacgtcc | ggtggtaggc | gcgggcaacg | aggtcggagc | cggccttgga | 8520 |
| cgccgcgtag | ggcgagttgg | gctccagcgg | gctgctctcg | gtccaggagc | cggagtcgat | 8580 |
| cgaccggtac | acctcgtcgg | tggagacgtg | cacgacctcg | ccgacgcggg | cgctcgagct | 8640 |
| gcaactggagc | agcgtctgcg | tgccctgcac | gttgggtctcg | gtgaacacgg | acgcgcccgc | 8700 |
| gatggagcgg | tccacgtggc | tctcgccgcg | gaagtggacg | atggcgtcca | cgccgcgcag | 8760 |
| ttcccggggc | aggaggccgg | cgtcgcggat | gtcgccgtgg | acgaagcgca | gtcgcgggtc | 8820 |
| cgcgctccacc | ggggcgaggt | tggcgcggtt | gcccgcgtag | gtgaggctgt | ccaggacgat | 8880 |
| cacctcatcg | gcgggcacgt | cggggtagcg | cccggcgagg | agctgccgca | cgaagtgcga | 8940 |
| gccgatgaag | cccgcacctc | cggtcaccag | aagccgcact | gccgtcttcc | tttcgggtcgc | 9000 |
| gctgtaggtc | gcggtgtggg | tcgactgttc | ggtggcggtg | cgggtcgcgg | tgtgggtcgc | 9060 |
| actgtcgggtg | cgctgtcggg | tcgtgggaac | gcgtcgcccg | cgaggtgcc | tcacggggct | 9120 |
| ccctcgcggc | cggcgatctc | catcagatag | ctgccgtact | cggtgcggga | gaggccttct | 9180 |
| cccaggccgt | gacaggcctc | ggcgtcgatg | aagcccatgc | ggaaggcgat | ctcctcaagg | 9240 |
| cccgcgatcc | agacgccctg | ccgctcctcc | aggacctgga | cgtactgggc | ggcccgagc | 9300 |
| agcaggtcgt | gggtgccggg | gtccagccag | gcgaagccgc | ggcccaggtt | gacgagttcg | 9360 |
| gcccggcccc | gctccaggta | gacgcgggtg | acgtcgggtg | tctccagctc | gccgcgcggc | 9420 |
| gagggccgga | tgttcttggc | gatgtcgacg | acgtcgttgt | cgtagaggta | gaggccgggtg | 9480 |
| acggcgaggt | tggagcgcg | cttgacgggc | ttctcgacga | ggtcggtcag | ccggcccgtc | 9540 |
| cgtccacact | gggcgacgcc | gtaccgctcg | gggtccttga | ccgggtagcc | gaagagcacg | 9600 |
| cagccgtcga | cggcgcgatg | gctgtccccg | aggagcgtgt | agaggccggg | cccgtggaag | 9660 |
| atgttgtcgc | ccaggatcag | ggcgaggtg | tcgtcgccga | tgtgctcggc | tccgacgaga | 9720 |
| agtgcgtccg | cgattcctgc | gggctctttc | tggaccgcat | agtcgagttc | tattcccagg | 9780 |
| tgcttgccgt | ttccgagaag | cgactggaag | agttcgatgt | gctggggggg | cgagatgatt | 9840 |
| tgaatctcgc | gaataccgcc | gagcatgaga | accgacagcg | gatagtagat | catcggtttg | 9900 |
| ttgtagaccg | gaagaatctg | cttcgaaatg | accgaggtcg | ccggatgcag | ccgagttccg | 9960 |
| ctcccgcggg | ccaggactat | tcccttcatt | ctcggaact | agcagcaggg | cgccgggtgat | 10020 |

| | | | | | | |
|-------------|------------|-------------|------------|-------------|-------------|-------|
| aacggtcggc | gtggcgagtt | aggggggagc | taggggctgc | gcagggggag | tgtcaccacc | 10080 |
| cctttggggg | gtgggaaaac | accgagggcc | cgccgggacg | gccggggcct | caggtggggg | 10140 |
| gatcgtgggg | gggggatcgg | ggggatcggg | gcgggtgcgg | gtcagcgcag | gaagccgcgg | 10200 |
| gcctcctccc | agcgtccgc | ggcgtcgcgc | tccagctggt | tcaggcgggc | ggtgacgacc | 10260 |
| tgatcgaagc | cgtccatgaa | gtactcgtcg | ccgtcgcagg | ccgccacctc | gccgcgcgcg | 10320 |
| tcgacgaagt | ccctgacgac | ctcgggtgagg | gaggtgtcgg | gggtcacgcg | gccgcgcatg | 10380 |
| tagcgggtcg | cgccgtccag | gtcgggggaag | ccggcctcgc | ggtacaggta | cacgtcgccg | 10440 |
| aggagatcga | cctgcaccgc | gacctgcggg | tgcgcggtgg | gccgcattgt | ggcgggcttg | 10500 |
| atccgcagca | gttcggcgct | ggccccgggt | cgcaggctgt | tcaggggcgta | gccgtagtcg | 10560 |
| atgtggagtc | cggggggtgc | ctcgcggacc | cgctcctcga | aggcgttgag | ggcctcctgg | 10620 |
| agctcggccc | gctcctcctg | cggcagcttg | ccgtcgtcac | ggccgctgta | gtcctcgcga | 10680 |
| atgttgacga | agtcgatcgt | cctgcccctg | ccggcgtcgt | tgaggtcggc | gatgaagtgc | 10740 |
| accaggtcga | gcaggcgagg | ggcacggccc | gggagcacga | tgtaggcgaa | gccgaggttg | 10800 |
| atcggcgact | gcgcgtcggc | gcgcagctgc | tggaaagcga | gcaggttctc | gcggacgcgg | 10860 |
| cgggaaggcgg | ccttcttgcc | ggtggtctgc | tcgtactcct | cgctcgttgag | gccgtagagc | 10920 |
| gaggtgcgga | tggcgtgcag | gccccagagg | ccgggctggc | gctccagggt | gcgctcgggtg | 10980 |
| agcgcgaagg | agttcgtgta | gacgggtggc | cgcaggccgt | ggtcgggtgg | gtgcgcggcc | 11040 |
| aggctcccga | ggccgggggt | ggtgagcggc | tccaggccgc | cggagaagta | catcgccgag | 11100 |
| gggttgcccc | cgggatatct | gtcgatgacc | gaccggaaca | tggcgttgcc | ggcgtcgagg | 11160 |
| gcggacgggt | cgtagcgggc | gccgggtcac | cggacgcaga | agtggcagcg | gaacatgcag | 11220 |
| gtcgggcccg | ggtagaggcc | gacgtgttac | gggaagacgg | gcttcctggc | gagcgcgcgg | 11280 |
| tcgaagacgc | cgcgctgttc | gagcgggagc | aggggtgtct | tccagtacgc | cccggcgggg | 11340 |
| ccggtctcga | ccgcgggtgc | gagctccggg | acctgcccga | acagggcgag | gagggcgcgg | 11400 |
| aaggcgtccc | ggtcgacgcc | caggtcgtgg | cgggcctcct | ccagcggggg | gaaggggctg | 11460 |
| ttgccgtagc | gcacggcgag | ccggacgagg | tggcgggccc | tcgttcgggc | ctcgtcgggc | 11520 |
| ggcacgaggc | cgccggcggc | gagggctctg | ccgacggcgt | ggaccgccgc | ccccagatcg | 11580 |
| gctccggggg | gcgcgcagcg | ttcggccggg | gcggtggcgg | aaagggcggg | ggcggtcatc | 11640 |
| gggagcgtcc | aatcgtgggc | gtggatgtct | ggggggccgc | gagcggggcg | ggggccgtgt | 11700 |
| cgcggtggcg | cgcggtcagt | tcgcggccgc | gggtcgcgca | gagacgcagc | aggtcggcga | 11760 |
| cccggcggat | gtcgtcgtcg | ccgatggcgg | tgccggtcgg | cagggacagc | acgcgcgcgg | 11820 |
| cgaggcggtc | ggtgtgcggc | agcggggcgt | cgcggtgcc | gcggtacggc | tccagctcgt | 11880 |
| ggcagcccgg | cgagaagtag | gcgcgggtgt | gcacgccttc | ggccttcagg | acctccatga | 11940 |
| cgaggtcgcg | gtggatgccg | gtggtggcct | cgctcatctc | gacgatcacg | tactggtggt | 12000 |
| tggtgaggcc | gtggcggtcg | tggtcggcga | cgaggacgcc | ggggaggtcc | gcgaggtgct | 12060 |
| cgcggtaggc | ggcgtggttg | cgccggttcc | ggtcgatgac | ctcgggaaac | gcgtcgaggg | 12120 |
| aggtagggcc | catggcgggc | gcggcctcgc | tcatcttggt | gttgggtccc | ccggcggggc | 12180 |
| tgccgcccgg | caggtcgaag | ccgaagtgtg | ggagggcgcg | gatccggggc | gcgaggtcgg | 12240 |
| gctcgtcggt | gacgacggcg | ccgccctcga | aggcgttgac | ggccttggtg | gcgtggaagc | 12300 |
| tgaagacctc | aggctgcccg | agcgcgagcg | cgggccggcc | gtcgaccgcg | cagccgaggg | 12360 |
| cgtgcgcggc | gtcgaagtag | agccgcaggc | cgtgctcgtc | ggcgaccttc | cgagctggtg | 12420 |
| cggcggcgca | ggggcgggcc | cagaggtgga | cgccgacgac | ggccgaggtg | cggggtgtga | 12480 |
| ccgcggcggc | cacctggtcc | gggtcgaggt | tgccggtgtc | cgggtcgatg | tcggcgaaga | 12540 |
| ccggggtgag | gccgatccag | cgcatgctgt | gcggggtggc | ggcgaacgtc | atcgacggca | 12600 |
| tgatcacttc | gccggtgagg | ccggcggcgt | gcgcgaggag | ctggagcccg | gccgtggcgt | 12660 |
| tgacggtggc | cacggcatgc | cggaccccgg | cgagcccggc | gacgcgctcc | tcgaactcgc | 12720 |
| ggacgagcgg | gccgccgttg | gacagccact | ggctgtcgag | ggcccgggtc | agccgctcgt | 12780 |
| acagcctggc | gcggtcgatg | cggttgggcc | gccccacgag | gagcggctgg | tcgaaagcgg | 12840 |
| cggggccggc | gaagaatgcg | aggctcgata | aggcgctttt | cacggatgtt | ccctccgggc | 12900 |
| caccgtcacg | aaatgattcg | ccgatccggg | aatcccgaac | gaggtcgccg | cgctccaccg | 12960 |
| tgacgtacga | cgagatggtc | gattgtgggt | gtcgatttct | gggggactct | aatccgcgcg | 13020 |
| gaacgggacc | gacaagagca | cgctatgcgc | tctcgatgtg | cttcggatca | catccgcctc | 13080 |
| cggggtattc | catcggcggc | ccgaatgtga | tgatccttga | caggatccgg | gaatcagccg | 13140 |
| agccgcccgg | agggccgggg | cgcgctccgc | ggaagagtac | gtgtgagaag | tcccgttcct | 13200 |
| cttcccgttt | ccgttcgcgt | tccggcccgg | tctggagttc | tccgtgcgcc | gtacccagca | 13260 |
| gggaacgacc | gcttctcccc | cgttactcga | cctcggggcc | ctggggcagg | atttcgcggc | 13320 |
| cgatccgtat | ccagctacgc | cgagactcgc | tcggaggggt | ccggcccacc | gggtgcgcac | 13380 |
| ccccgagggg | gacgaggtgt | ggctgggtcgt | cggtacgac | cgggcgcggg | cggtcctcgc | 13440 |
| cgatccccgg | ttcagcaaga | ctggcgcaac | tccacgactc | ccctgaccga | agccgaagcc | 13500 |
| gcgctcaacc | acaacatgct | gagttccgaa | cccgcgcggg | cacaccgcgg | tgcgccagct | 13560 |
| ggtggcccgt | gagttcacca | tgcgccgggtg | cgagttgctg | ccgccccggg | tcc | 13613 |

<210> 4
 <211> 3782
 <212> PRT
 <213> Streptomyces venezuelae

<400> 4
 Met Thr Asp Asp Leu Thr Gly Ala Leu Thr Gln Pro Pro Leu Gly Arg
 1 5 10 15
 Thr Val Arg Ala Val Ala Asp Arg Glu Leu Gly Thr His Leu Leu Glu
 20 25 30
 Thr Arg Gly Ile His Trp Ile His Ala Ala Asn Gly Asp Pro Tyr Ala
 35 40 45
 Thr Val Leu Arg Gly Gln Ala Asp Asp Pro Tyr Pro Ala Tyr Glu Arg
 50 55 60
 Val Arg Ala Arg Gly Ala Leu Ser Phe Ser Pro Thr Gly Ser Trp Val
 65 70 75 80
 Thr Ala Asp His Ala Leu Ala Ala Ser Ile Leu Cys Ser Thr Asp Phe
 85 90 95
 Gly Val Ser Gly Ala Asp Gly Val Pro Val Pro Gln Gln Val Leu Ser
 100 105 110
 Tyr Gly Glu Gly Cys Pro Leu Glu Arg Glu Gln Val Leu Pro Ala Ala
 115 120 125
 Gly Asp Val Pro Glu Gly Gly Gln Arg Ala Val Val Glu Gly Ile His
 130 135 140
 Arg Glu Thr Leu Glu Gly Leu Ala Pro Asp Pro Ser Ala Ser Tyr Ala
 145 150 155 160
 Phe Glu Leu Leu Gly Gly Phe Val Arg Pro Ala Val Thr Ala Ala Ala
 165 170 175
 Ala Ala Val Leu Gly Val Pro Ala Asp Arg Arg Ala Asp Phe Ala Asp
 180 185 190
 Leu Leu Glu Arg Leu Arg Pro Leu Ser Asp Ser Leu Leu Ala Pro Gln
 195 200 205
 Ser Leu Arg Thr Val Arg Ala Ala Asp Gly Ala Leu Ala Glu Leu Thr
 210 215 220
 Ala Leu Leu Ala Asp Ser Asp Asp Ser Pro Gly Ala Leu Leu Ser Ala
 225 230 235 240
 Leu Gly Val Thr Ala Ala Val Gln Leu Thr Gly Asn Ala Val Leu Ala
 245 250 255
 Leu Leu Ala His Pro Glu Gln Trp Arg Glu Leu Cys Asp Arg Pro Gly
 260 265 270
 Leu Ala Ala Ala Ala Val Glu Glu Thr Leu Arg Tyr Asp Pro Pro Val
 275 280 285
 Gln Leu Asp Ala Arg Val Val Arg Gly Glu Thr Glu Leu Ala Gly Arg
 290 295 300
 Arg Leu Pro Ala Gly Ala His Val Val Val Leu Thr Ala Ala Thr Gly
 305 310 315 320
 Arg Asp Pro Glu Val Phe Thr Asp Pro Glu Arg Phe Asp Leu Ala Arg
 325 330 335
 Pro Asp Ala Ala Ala His Leu Ala Leu His Pro Ala Gly Pro Tyr Gly
 340 345 350
 Pro Val Ala Ser Leu Val Arg Leu Gln Ala Glu Val Ala Leu Arg Thr
 355 360 365
 Leu Ala Gly Arg Phe Pro Gly Leu Arg Gln Ala Gly Asp Val Leu Arg
 370 375 380
 Pro Arg Arg Ala Pro Val Gly Arg Gly Pro Leu Ser Val Pro Val Ser
 385 390 395 400
 Ser Ser Met Arg Val Leu Leu Thr Ser Phe Ala His His Thr His Tyr
 405 410 415
 Tyr Gly Leu Val Pro Leu Ala Trp Ala Leu Leu Ala Ala Gly His Glu
 420 425 430
 Val Arg Val Ala Ser Gln Pro Ala Leu Thr Asp Thr Ile Thr Gly Ser
 435 440 445

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Leu | Ala | Ala | Val | Pro | Val | Gly | Thr | Asp | His | Leu | Ile | His | Glu | Tyr |
| 450 | | | | | | 455 | | | | | 460 | | | | |
| Arg | Val | Arg | Met | Ala | Gly | Glu | Pro | Arg | Pro | Asn | His | Pro | Ala | Ile | Ala |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 |
| Phe | Asp | Glu | Ala | Arg | Pro | Glu | Pro | Leu | Asp | Trp | Asp | His | Ala | Leu | Gly |
| | | | | 485 | | | | | 490 | | | | | 495 | |
| Ile | Glu | Ala | Ile | Leu | Ala | Pro | Tyr | Phe | His | Leu | Leu | Ala | Asn | Asn | Asp |
| | | | 500 | | | | | 505 | | | | | 510 | | |
| Ser | Met | Val | Asp | Asp | Leu | Val | Asp | Phe | Ala | Arg | Ser | Trp | Gln | Pro | Asp |
| | | 515 | | | | | 520 | | | | | 525 | | | |
| Leu | Val | Leu | Trp | Glu | Pro | Thr | Thr | Tyr | Ala | Gly | Ala | Val | Ala | Ala | Gln |
| | | 530 | | | | 535 | | | | | 540 | | | | |
| Val | Thr | Gly | Ala | Ala | His | Ala | Arg | Val | Leu | Trp | Gly | Pro | Asp | Val | Met |
| 545 | | | | | 550 | | | | | 555 | | | | | 560 |
| Gly | Ser | Ala | Arg | Arg | Lys | Phe | Val | Ala | Leu | Arg | Asp | Arg | Gln | Pro | Pro |
| | | | | 565 | | | | | 570 | | | | | 575 | |
| Glu | His | Arg | Glu | Asp | Pro | Thr | Ala | Glu | Trp | Leu | Thr | Trp | Thr | Leu | Asp |
| | | | 580 | | | | | 585 | | | | | 590 | | |
| Arg | Tyr | Gly | Ala | Ser | Phe | Glu | Glu | Glu | Leu | Leu | Thr | Gly | Gln | Phe | Thr |
| | | 595 | | | | | 600 | | | | | 605 | | | |
| Ile | Asp | Pro | Thr | Pro | Pro | Ser | Leu | Arg | Leu | Asp | Thr | Gly | Leu | Pro | Thr |
| | 610 | | | | | 615 | | | | | 620 | | | | |
| Val | Gly | Met | Arg | Tyr | Val | Pro | Tyr | Asn | Gly | Thr | Ser | Val | Val | Pro | Asp |
| 625 | | | | | 630 | | | | | 635 | | | | | 640 |
| Trp | Leu | Ser | Glu | Pro | Pro | Ala | Arg | Pro | Arg | Val | Cys | Leu | Thr | Leu | Gly |
| | | | | 645 | | | | | 650 | | | | | 655 | |
| Val | Ser | Ala | Arg | Glu | Val | Leu | Gly | Gly | Asp | Gly | Val | Ser | Gln | Gly | Asp |
| | | | 660 | | | | 665 | | | | | | 670 | | |
| Ile | Leu | Glu | Ala | Leu | Ala | Asp | Leu | Asp | Ile | Glu | Leu | Val | Ala | Thr | Leu |
| | | 675 | | | | | 680 | | | | | 685 | | | |
| Asp | Ala | Ser | Gln | Arg | Ala | Glu | Ile | Arg | Asn | Tyr | Pro | Lys | His | Thr | Arg |
| | 690 | | | | | 695 | | | | | 700 | | | | |
| Phe | Thr | Asp | Phe | Val | Pro | Met | His | Ala | Leu | Leu | Pro | Ser | Cys | Ser | Ala |
| 705 | | | | | 710 | | | | | 715 | | | | | 720 |
| Ile | Ile | His | His | Gly | Gly | Ala | Gly | Thr | Tyr | Ala | Thr | Ala | Val | Ile | Asn |
| | | | | 725 | | | | | 730 | | | | | 735 | |
| Ala | Val | Pro | Gln | Val | Met | Leu | Ala | Glu | Leu | Trp | Asp | Ala | Pro | Val | Lys |
| | | | 740 | | | | | 745 | | | | | 750 | | |
| Ala | Arg | Ala | Val | Ala | Glu | Gln | Gly | Ala | Gly | Phe | Phe | Leu | Pro | Pro | Ala |
| | | 755 | | | | | 760 | | | | | 765 | | | |
| Glu | Leu | Thr | Pro | Gln | Ala | Val | Arg | Asp | Ala | Val | Val | Arg | Ile | Leu | Asp |
| | | 770 | | | | 775 | | | | | 780 | | | | |
| Asp | Pro | Ser | Val | Ala | Thr | Ala | Ala | His | Arg | Leu | Arg | Glu | Glu | Thr | Phe |
| 785 | | | | | 790 | | | | | 795 | | | | | 800 |
| Gly | Asp | Pro | Thr | Pro | Ala | Gly | Ile | Val | Pro | Glu | Leu | Glu | Arg | Leu | Ala |
| | | | | 805 | | | | | 810 | | | | | 815 | |
| Ala | Gln | His | Arg | Arg | Pro | Pro | Ala | Asp | Ala | Arg | His | Met | Tyr | Glu | Val |
| | | | 820 | | | | | 825 | | | | | 830 | | |
| Asp | His | Ala | Asp | Val | Tyr | Asp | Leu | Phe | Tyr | Leu | Gly | Arg | Gly | Lys | Asp |
| | | 835 | | | | | 840 | | | | | 845 | | | |
| Tyr | Ala | Ala | Glu | Ala | Ser | Asp | Ile | Ala | Asp | Leu | Val | Arg | Ser | Arg | Thr |
| | | 850 | | | | 855 | | | | | 860 | | | | |
| Pro | Glu | Ala | Ser | Ser | Leu | Leu | Asp | Val | Ala | Cys | Gly | Thr | Gly | Thr | His |
| 865 | | | | | 870 | | | | | 875 | | | | | 880 |
| Leu | Glu | His | Phe | Thr | Lys | Glu | Phe | Gly | Asp | Thr | Ala | Gly | Leu | Glu | Leu |
| | | | | 885 | | | | | 890 | | | | | 895 | |
| Ser | Glu | Asp | Met | Leu | Thr | His | Ala | Arg | Lys | Arg | Leu | Pro | Asp | Ala | Thr |
| | | | 900 | | | | | 905 | | | | | 910 | | |
| Leu | His | Gln | Gly | Asp | Met | Arg | Asp | Phe | Arg | Leu | Gly | Arg | Lys | Phe | Ser |
| | | 915 | | | | | 920 | | | | | 925 | | | |
| Ala | Val | Val | Ser | Met | Phe | Ser | Ser | Val | Gly | Tyr | Leu | Lys | Thr | Thr | Glu |
| | 930 | | | | | 935 | | | | | 940 | | | | |

| | | | | | | | | | | | | | | | | | | | |
|------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|
| Glu | Leu | Gly | Ala | Ala | Val | Ala | Ser | Phe | Ala | Glu | His | Leu | Glu | Pro | Gly | 945 | 950 | 955 | 960 |
| Gly | Val | Val | Val | Val | Glu | Pro | Trp | Trp | Phe | Pro | Glu | Thr | Phe | Ala | Asp | | | | |
| | | | | 965 | | | | | 970 | | | | | | 975 | | | | |
| Gly | Trp | Val | Ser | Ala | Asp | Val | Val | Arg | Arg | Asp | Gly | Arg | Thr | Val | Ala | | | | |
| | | | 980 | | | | | 985 | | | | | 990 | | | | | | |
| Arg | Val | Ser | His | Ser | Val | Arg | Glu | Gly | Asn | Ala | Thr | Arg | Met | Glu | Val | | | | |
| | | 995 | | | | | 1000 | | | | | 1005 | | | | | | | |
| His | Phe | Thr | Val | Ala | Asp | Pro | Gly | Lys | Gly | Val | Arg | His | Phe | Ser | Asp | | | | |
| | 1010 | | | | | 1015 | | | | | 1020 | | | | | | | | |
| Val | His | Leu | Ile | Thr | Leu | Phe | His | Gln | Ala | Glu | Tyr | Glu | Ala | Ala | Phe | | | | |
| 1025 | | | | | | 1030 | | | | 1035 | | | | | 1040 | | | | |
| Thr | Ala | Ala | Gly | Leu | Arg | Val | Glu | Tyr | Leu | Glu | Gly | Gly | Pro | Ser | Gly | | | | |
| | | | 1045 | | | | | | 1050 | | | | | | 1055 | | | | |
| Arg | Gly | Leu | Phe | Val | Gly | Val | Pro | Ala | Met | Thr | Gly | Lys | Thr | Arg | Ile | | | | |
| | | | 1060 | | | | | 1065 | | | | | 1070 | | | | | | |
| Pro | Arg | Val | Arg | Arg | Gly | Arg | Thr | Thr | Pro | Arg | Ala | Phe | Thr | Leu | Ala | | | | |
| | | 1075 | | | | | 1080 | | | | | 1085 | | | | | | | |
| Val | Val | Gly | Thr | Leu | Leu | Ala | Gly | Thr | Thr | Val | Ala | Ala | Ala | Ala | Pro | | | | |
| | 1090 | | | | | 1095 | | | | 1100 | | | | | | | | | |
| Gly | Ala | Ala | Asp | Thr | Ala | Asn | Val | Gln | Tyr | Thr | Ser | Arg | Ala | Ala | Glu | | | | |
| 1105 | | | | | 1110 | | | | | 1115 | | | | | 1120 | | | | |
| Leu | Val | Ala | Gln | Met | Thr | Leu | Asp | Glu | Lys | Ile | Ser | Phe | Val | His | Trp | | | | |
| | | | 1125 | | | | | | 1130 | | | | | | 1135 | | | | |
| Ala | Leu | Asp | Pro | Asp | Arg | Gln | Asn | Val | Gly | Tyr | Leu | Pro | Gly | Val | Pro | | | | |
| | | 1140 | | | | | 1145 | | | | | | 1150 | | | | | | |
| Arg | Leu | Gly | Ile | Pro | Glu | Leu | Arg | Ala | Ala | Asp | Gly | Pro | Asn | Gly | Ile | | | | |
| | | 1155 | | | | | 1160 | | | | | 1165 | | | | | | | |
| Arg | Leu | Val | Gly | Gln | Thr | Ala | Thr | Ala | Leu | Pro | Ala | Pro | Val | Ala | Leu | | | | |
| | 1170 | | | | | 1175 | | | | | 1180 | | | | | | | | |
| Ala | Ser | Thr | Phe | Asp | Asp | Thr | Met | Ala | Asp | Ser | Tyr | Gly | Lys | Val | Met | | | | |
| 1185 | | | | | 1190 | | | | | 1195 | | | | | 1200 | | | | |
| Gly | Arg | Asp | Gly | Arg | Ala | Leu | Asn | Gln | Asp | Met | Val | Leu | Gly | Pro | Met | | | | |
| | | | 1205 | | | | | | 1210 | | | | | 1215 | | | | | |
| Met | Asn | Asn | Ile | Arg | Val | Pro | His | Gly | Gly | Arg | Asn | Tyr | Glu | Thr | Phe | | | | |
| | | 1220 | | | | | | 1225 | | | | | 1230 | | | | | | |
| Ser | Glu | Asp | Pro | Leu | Val | Ser | Ser | Arg | Thr | Ala | Val | Ala | Gln | Ile | Lys | | | | |
| | 1235 | | | | | | 1240 | | | | | 1245 | | | | | | | |
| Gly | Ile | Gln | Gly | Ala | Gly | Leu | Met | Thr | Thr | Ala | Lys | His | Phe | Ala | Ala | | | | |
| | 1250 | | | | | 1255 | | | | | 1260 | | | | | | | | |
| Asn | Asn | Gln | Glu | Asn | Asn | Arg | Phe | Ser | Val | Asn | Ala | Asn | Val | Asp | Glu | | | | |
| 1265 | | | | | 1270 | | | | | 1275 | | | | | 1280 | | | | |
| Gln | Thr | Leu | Arg | Glu | Ile | Glu | Phe | Pro | Ala | Phe | Glu | Ala | Ser | Ser | Lys | | | | |
| | | | 1285 | | | | | | 1290 | | | | | 1295 | | | | | |
| Ala | Gly | Ala | Ala | Ser | Phe | Met | Cys | Ala | Tyr | Asn | Gly | Leu | Asn | Gly | Lys | | | | |
| | | 1300 | | | | | | 1305 | | | | | 1310 | | | | | | |
| Pro | Ser | Cys | Gly | Asn | Asp | Glu | Leu | Leu | Asn | Asn | Val | Leu | Arg | Thr | Gln | | | | |
| | | 1315 | | | | | 1320 | | | | | 1325 | | | | | | | |
| Trp | Gly | Phe | Gln | Gly | Trp | Val | Met | Ser | Asp | Trp | Leu | Ala | Thr | Pro | Gly | | | | |
| | 1330 | | | | | 1335 | | | | | 1340 | | | | | | | | |
| Thr | Asp | Ala | Ile | Thr | Lys | Gly | Leu | Asp | Gln | Glu | Met | Gly | Val | Glu | Leu | | | | |
| 1345 | | | | | 1350 | | | | | 1355 | | | | | 1360 | | | | |
| Pro | Gly | Asp | Val | Pro | Lys | Gly | Glu | Pro | Ser | Pro | Pro | Ala | Lys | Phe | Phe | | | | |
| | | | 1365 | | | | | | 1370 | | | | | 1375 | | | | | |
| Gly | Glu | Ala | Leu | Lys | Thr | Ala | Val | Leu | Asn | Gly | Thr | Val | Pro | Glu | Ala | | | | |
| | | 1380 | | | | | 1385 | | | | | 1390 | | | | | | | |
| Ala | Val | Thr | Arg | Ser | Ala | Glu | Arg | Ile | Val | Gly | Gln | Met | Glu | Lys | Phe | | | | |
| | 1395 | | | | | | 1400 | | | | | 1405 | | | | | | | |
| Gly | Leu | Leu | Leu | Ala | Thr | Pro | Ala | Pro | Arg | Pro | Glu | Arg | Asp | Lys | Ala | | | | |
| | 1410 | | | | | 1415 | | | | | 1420 | | | | | | | | |
| Gly | Ala | Gln | Ala | Val | Ser | Arg | Lys | Val | Ala | Glu | Asn | Gly | Ala | Val | Leu | | | | |
| 1425 | | | | | 1430 | | | | | 1435 | | | | | 1440 | | | | |

Leu Arg Asn Glu Gly Gln Ala Leu Pro Leu Ala Gly Asp Ala Gly Lys
 1445 1450 1455
 Ser Ile Ala Val Ile Gly Pro Thr Ala Val Asp Pro Lys Val Thr Gly
 1460 1465 1470
 Leu Gly Ser Ala His Val Val Pro Asp Ser Ala Ala Ala Pro Leu Asp
 1475 1480 1485
 Thr Ile Lys Ala Arg Ala Gly Ala Gly Ala Thr Val Thr Tyr Glu Thr
 1490 1495 1500
 Gly Glu Glu Thr Phe Gly Thr Gln Ile Pro Ala Gly Asn Leu Ser Pro
 1505 1510 1515 1520
 Ala Phe Asn Gln Gly His Gln Leu Glu Pro Gly Lys Ala Gly Ala Leu
 1525 1530 1535
 Tyr Asp Gly Thr Leu Thr Val Pro Ala Asp Gly Glu Tyr Arg Ile Ala
 1540 1545 1550
 Val Arg Ala Thr Gly Gly Tyr Ala Thr Val Gln Leu Gly Ser His Thr
 1555 1560 1565
 Ile Glu Ala Gly Gln Val Tyr Gly Lys Val Ser Ser Pro Leu Leu Lys
 1570 1575 1580
 Leu Thr Lys Gly Thr His Lys Leu Thr Ile Ser Gly Phe Ala Met Ser
 1585 1590 1595 1600
 Ala Thr Pro Leu Ser Leu Glu Leu Gly Trp Val Thr Pro Ala Ala Ala
 1605 1610 1615
 Asp Ala Thr Ile Ala Lys Ala Val Glu Ser Ala Arg Lys Ala Arg Thr
 1620 1625 1630
 Ala Val Val Phe Ala Tyr Asp Asp Gly Thr Glu Gly Val Asp Arg Pro
 1635 1640 1645
 Asn Leu Ser Leu Pro Gly Thr Gln Asp Lys Leu Ile Ser Ala Val Ala
 1650 1655 1660
 Asp Ala Asn Pro Asn Thr Ile Val Val Leu Asn Thr Gly Ser Ser Val
 1665 1670 1675 1680
 Leu Met Pro Trp Leu Ser Lys Thr Arg Ala Val Leu Asp Met Trp Tyr
 1685 1690 1695
 Pro Gly Gln Ala Gly Ala Glu Ala Thr Ala Ala Leu Leu Tyr Gly Asp
 1700 1705 1710
 Val Asn Pro Ser Gly Lys Leu Thr Gln Ser Phe Pro Ala Ala Glu Asn
 1715 1720 1725
 Gln His Ala Val Ala Gly Asp Pro Thr Ser Tyr Pro Gly Val Asp Asn
 1730 1735 1740
 Gln Gln Thr Tyr Arg Glu Gly Ile His Val Gly Tyr Arg Trp Phe Asp
 1745 1750 1755 1760
 Lys Glu Asn Val Lys Pro Leu Phe Pro Phe Gly His Gly Leu Ser Tyr
 1765 1770 1775
 Thr Ser Phe Thr Gln Ser Ala Pro Thr Val Val Arg Thr Ser Thr Gly
 1780 1785 1790
 Gly Leu Lys Val Thr Val Thr Val Arg Asn Ser Gly Lys Arg Ala Gly
 1795 1800 1805
 Gln Glu Val Val Gln Ala Tyr Leu Gly Ala Ser Pro Asn Val Thr Ala
 1810 1815 1820
 Pro Gln Ala Lys Lys Lys Leu Val Gly Tyr Thr Lys Val Ser Leu Ala
 1825 1830 1835 1840
 Ala Gly Glu Ala Lys Thr Val Thr Val Asn Val Asp Arg Arg Gln Leu
 1845 1850 1855
 Gln Thr Gly Ser Ser Ser Ala Asp Leu Arg Gly Ser Ala Thr Val Asn
 1860 1865 1870
 Val Trp Met Ser Ser Arg Ala Glu Thr Pro Arg Val Pro Phe Leu Asp
 1875 1880 1885
 Leu Lys Ala Ala Tyr Glu Glu Leu Arg Ala Glu Thr Asp Ala Ala Ile
 1890 1895 1900
 Ala Arg Val Leu Asp Ser Gly Arg Tyr Leu Leu Gly Pro Glu Leu Glu
 1905 1910 1915 1920
 Gly Phe Glu Ala Glu Phe Ala Ala Tyr Cys Glu Thr Asp His Ala Val
 1925 1930 1935

| | | | | | | | | | | | | | | | |
|------|-----|------|------|------|-----|------|-----|------|-----|------|------|-----|------|-----|------|
| Gly | Val | Asn | Ser | Gly | Met | Asp | Ala | Leu | Gln | Leu | Ala | Leu | Arg | Gly | Leu |
| | | 1940 | | | | | | 1945 | | | | | 1950 | | |
| Gly | Ile | Gly | Pro | Gly | Asp | Glu | Val | Ile | Val | Pro | Ser | His | Thr | Tyr | Ile |
| | | 1955 | | | | | | 1960 | | | | | 1965 | | |
| Ala | Ser | Trp | Leu | Ala | Val | Ser | Ala | Thr | Gly | Ala | Thr | Pro | Val | Pro | Val |
| | | 1970 | | | | | | 1975 | | | | | 1980 | | |
| Glu | Pro | His | Glu | Asp | His | Pro | Thr | Leu | Asp | Pro | Leu | Leu | Val | Glu | Lys |
| 1985 | | | | | | 1990 | | | | 1995 | | | | | 2000 |
| Ala | Ile | Thr | Pro | Arg | Thr | Arg | Ala | Leu | Leu | Pro | Val | His | Leu | Tyr | Gly |
| | | | | 2005 | | | | | | 2010 | | | | | 2015 |
| His | Pro | Ala | Asp | Met | Asp | Ala | Leu | Arg | Glu | Leu | Ala | Asp | Arg | His | Gly |
| | | | 2020 | | | | | | | 2025 | | | | | 2030 |
| Leu | His | Ile | Val | Glu | Asp | Ala | Ala | Gln | Ala | His | Gly | Ala | Arg | Tyr | Arg |
| | | 2035 | | | | | | 2040 | | | | | 2045 | | |
| Gly | Arg | Arg | Ile | Gly | Ala | Gly | Ser | Ser | Val | Ala | Ala | Phe | Ser | Phe | Tyr |
| | | 2050 | | | | | | 2055 | | | | | 2060 | | |
| Pro | Gly | Lys | Asn | Leu | Gly | Cys | Phe | Gly | Asp | Gly | Gly | Ala | Val | Val | Thr |
| 2065 | | | | | | 2070 | | | | 2075 | | | | | 2080 |
| Gly | Asp | Pro | Glu | Leu | Ala | Glu | Arg | Leu | Arg | Met | Leu | Arg | Asn | Tyr | Gly |
| | | | | 2085 | | | | | | 2090 | | | | | 2095 |
| Ser | Arg | Gln | Lys | Tyr | Ser | His | Glu | Thr | Lys | Gly | Thr | Asn | Ser | Arg | Leu |
| | | | 2100 | | | | | | | 2105 | | | | | 2110 |
| Asp | Glu | Met | Gln | Ala | Ala | Val | Leu | Arg | Ile | Arg | Leu | Ala | His | Leu | Asp |
| | | 2115 | | | | | | | | 2120 | | | | | 2125 |
| Ser | Trp | Asn | Gly | Arg | Arg | Ser | Ala | Leu | Ala | Ala | Glu | Tyr | Leu | Ser | Gly |
| | | 2130 | | | | | | | | 2135 | | | | | 2140 |
| Leu | Ala | Gly | Leu | Pro | Gly | Ile | Gly | Leu | Pro | Val | Thr | Ala | Pro | Asp | Thr |
| 2145 | | | | | | 2150 | | | | | 2155 | | | | 2160 |
| Asp | Pro | Val | Trp | His | Leu | Phe | Thr | Val | Arg | Thr | Glu | Arg | Arg | Asp | Glu |
| | | | | 2165 | | | | | | 2170 | | | | | 2175 |
| Leu | Arg | Ser | His | Leu | Asp | Ala | Arg | Gly | Ile | Asp | Thr | Leu | Thr | His | Tyr |
| | | | 2180 | | | | | | | 2185 | | | | | 2190 |
| Pro | Val | Pro | Val | His | Leu | Ser | Pro | Ala | Tyr | Ala | Gly | Glu | Ala | Pro | Pro |
| | | 2195 | | | | | | | | 2200 | | | | | 2205 |
| Glu | Gly | Ser | Leu | Pro | Arg | Ala | Glu | Ser | Phe | Ala | Arg | Gln | Val | Leu | Ser |
| | | 2210 | | | | | | | | 2215 | | | | | 2220 |
| Leu | Pro | Ile | Gly | Pro | His | Leu | Glu | Arg | Pro | Gln | Ala | Leu | Arg | Val | Ile |
| 2225 | | | | | | 2230 | | | | | 2235 | | | | 2240 |
| Asp | Ala | Val | Arg | Glu | Trp | Ala | Glu | Arg | Val | Asp | Gln | Ala | Met | Arg | Leu |
| | | | | 2245 | | | | | | 2250 | | | | | 2255 |
| Leu | Val | Thr | Gly | Gly | Ala | Gly | Phe | Ile | Gly | Ser | His | Phe | Val | Arg | Gln |
| | | | 2260 | | | | | | | 2265 | | | | | 2270 |
| Leu | Leu | Ala | Gly | Ala | Tyr | Pro | Asp | Val | Pro | Ala | Asp | Glu | Val | Ile | Val |
| | | 2275 | | | | | | | | 2280 | | | | | 2285 |
| Leu | Asp | Ser | Leu | Thr | Tyr | Ala | Gly | Asn | Arg | Ala | Asn | Leu | Ala | Pro | Val |
| | | 2290 | | | | | | | | 2295 | | | | | 2300 |
| Asp | Ala | Asp | Pro | Arg | Leu | Arg | Phe | Val | His | Gly | Asp | Ile | Arg | Asp | Ala |
| 2305 | | | | | | 2310 | | | | | 2315 | | | | 2320 |
| Gly | Leu | Leu | Ala | Arg | Glu | Leu | Arg | Gly | Val | Asp | Ala | Ile | Val | His | Phe |
| | | | | 2325 | | | | | | 2330 | | | | | 2335 |
| Ala | Ala | Glu | Ser | His | Val | Asp | Arg | Ser | Ile | Ala | Gly | Ala | Ser | Val | Phe |
| | | | 2340 | | | | | | | 2345 | | | | | 2350 |
| Thr | Glu | Thr | Asn | Val | Gln | Gly | Thr | Gln | Thr | Leu | Leu | Gln | Cys | Ala | Val |
| | | 2355 | | | | | | | | 2360 | | | | | 2365 |
| Asp | Ala | Gly | Val | Gly | Arg | Val | Val | His | Val | Ser | Thr | Asp | Glu | Val | Tyr |
| | | 2370 | | | | | | | | 2375 | | | | | 2380 |
| Gly | Ser | Ile | Asp | Ser | Gly | Ser | Trp | Thr | Glu | Ser | Ser | Pro | Leu | Glu | Pro |
| 2385 | | | | | | 2390 | | | | | 2395 | | | | 2400 |
| Asn | Ser | Pro | Tyr | Ala | Ala | Ser | Lys | Ala | Gly | Ser | Asp | Leu | Val | Ala | Arg |
| | | | | 2405 | | | | | | 2410 | | | | | 2415 |
| Ala | Tyr | His | Arg | Thr | Tyr | Gly | Leu | Asp | Val | Arg | Ile | Thr | Arg | Cys | Cys |
| | | | 2420 | | | | | | | 2425 | | | | | 2430 |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Asn | Asn | Tyr | Gly | Pro | Tyr | Gln | His | Pro | Glu | Lys | Leu | Ile | Pro | Leu | Phe | 2435 | 2440 | 2445 |
| Val | Thr | Asn | Leu | Leu | Asp | Gly | Gly | Thr | Leu | Pro | Leu | Tyr | Gly | Asp | Gly | 2450 | 2455 | 2460 |
| Ala | Asn | Val | Arg | Glu | Trp | Val | His | Thr | Asp | Asp | His | Cys | Arg | Gly | Ile | 2465 | 2470 | 2475 |
| Ala | Leu | Val | Leu | Ala | Gly | Gly | Arg | Ala | Gly | Glu | Ile | Tyr | His | Ile | Gly | 2485 | 2490 | 2495 |
| Gly | Gly | Leu | Glu | Leu | Thr | Asn | Arg | Glu | Leu | Thr | Gly | Ile | Leu | Leu | Asp | 2500 | 2505 | 2510 |
| Ser | Leu | Gly | Ala | Asp | Trp | Ser | Ser | Val | Arg | Lys | Val | Ala | Asp | Arg | Lys | 2515 | 2520 | 2525 |
| Gly | His | Asp | Leu | Arg | Tyr | Ser | Leu | Asp | Gly | Gly | Glu | Ile | Glu | Arg | Glu | 2530 | 2535 | 2540 |
| Leu | Gly | Tyr | Arg | Pro | Gln | Val | Ser | Phe | Ala | Asp | Gly | Leu | Ala | Arg | Thr | 2545 | 2550 | 2555 |
| Val | Arg | Trp | Tyr | Arg | Glu | Asn | Arg | Gly | Trp | Trp | Glu | Pro | Leu | Lys | Ala | 2565 | 2570 | 2575 |
| Thr | Ala | Pro | Gln | Leu | Pro | Ala | Thr | Ala | Val | Glu | Val | Ser | Ala | Met | Lys | 2580 | 2585 | 2590 |
| Gly | Ile | Val | Leu | Ala | Gly | Gly | Ser | Gly | Thr | Arg | Leu | His | Pro | Ala | Thr | 2595 | 2600 | 2605 |
| Ser | Val | Ile | Ser | Lys | Gln | Ile | Leu | Pro | Val | Tyr | Asn | Lys | Pro | Met | Ile | 2610 | 2615 | 2620 |
| Tyr | Tyr | Pro | Leu | Ser | Val | Leu | Met | Leu | Gly | Gly | Ile | Arg | Glu | Ile | Gln | 2625 | 2630 | 2635 |
| Ile | Ile | Ser | Thr | Pro | Gln | His | Ile | Glu | Leu | Phe | Gln | Ser | Leu | Leu | Gly | 2645 | 2650 | 2655 |
| Asn | Gly | Arg | His | Leu | Gly | Ile | Glu | Leu | Asp | Tyr | Ala | Val | Gln | Lys | Glu | 2660 | 2665 | 2670 |
| Pro | Ala | Gly | Ile | Ala | Asp | Ala | Leu | Leu | Val | Gly | Ala | Glu | His | Ile | Gly | 2675 | 2680 | 2685 |
| Asp | Asp | Thr | Cys | Ala | Leu | Ile | Leu | Gly | Asp | Asn | Ile | Phe | His | Gly | Pro | 2690 | 2695 | 2700 |
| Gly | Leu | Tyr | Thr | Leu | Leu | Arg | Asp | Ser | Ile | Ala | Arg | Leu | Asp | Gly | Cys | 2705 | 2710 | 2715 |
| Val | Leu | Phe | Gly | Tyr | Pro | Val | Lys | Asp | Pro | Glu | Arg | Tyr | Gly | Val | Ala | 2725 | 2730 | 2735 |
| Glu | Val | Asp | Ala | Thr | Gly | Arg | Leu | Thr | Asp | Leu | Val | Glu | Lys | Pro | Val | 2740 | 2745 | 2750 |
| Lys | Pro | Arg | Ser | Asn | Leu | Ala | Val | Thr | Gly | Leu | Tyr | Leu | Tyr | Asp | Asn | 2755 | 2760 | 2765 |
| Asp | Val | Val | Asp | Ile | Ala | Lys | Asn | Ile | Arg | Pro | Ser | Pro | Arg | Gly | Glu | 2770 | 2775 | 2780 |
| Leu | Glu | Ile | Thr | Asp | Val | Asn | Arg | Val | Tyr | Leu | Glu | Arg | Gly | Arg | Ala | 2785 | 2790 | 2795 |
| Glu | Leu | Val | Asn | Leu | Gly | Arg | Gly | Phe | Ala | Trp | Leu | Asp | Thr | Gly | Thr | 2805 | 2810 | 2815 |
| His | Asp | Ser | Leu | Leu | Arg | Ala | Ala | Gln | Tyr | Val | Gln | Val | Leu | Glu | Glu | 2820 | 2825 | 2830 |
| Arg | Gln | Gly | Val | Trp | Ile | Ala | Gly | Leu | Glu | Glu | Ile | Ala | Phe | Arg | Met | 2835 | 2840 | 2845 |
| Gly | Phe | Ile | Asp | Ala | Glu | Ala | Cys | His | Gly | Leu | Gly | Glu | Gly | Leu | Ser | 2850 | 2855 | 2860 |
| Arg | Thr | Glu | Tyr | Gly | Ser | Tyr | Leu | Met | Glu | Ile | Ala | Gly | Arg | Glu | Gly | 2865 | 2870 | 2875 |
| Ala | Pro | Met | Thr | Ala | Pro | Ala | Leu | Ser | Ala | Thr | Ala | Pro | Ala | Glu | Arg | 2885 | 2890 | 2895 |
| Cys | Ala | His | Pro | Gly | Ala | Asp | Leu | Gly | Ala | Ala | Val | His | Ala | Val | Gly | 2900 | 2905 | 2910 |
| Gln | Thr | Leu | Ala | Ala | Gly | Gly | Leu | Val | Pro | Pro | Asp | Glu | Ala | Gly | Thr | 2915 | 2920 | 2925 |

Thr Ala Arg His Leu Val Arg Leu Ala Val Arg Tyr Gly Asn Ser Pro
 2930 2935 2940
 Phe Thr Pro Leu Glu Glu Ala Arg His Asp Leu Gly Val Asp Arg Asp
 2945 2950 2955 2960
 Ala Phe Arg Arg Leu Leu Ala Leu Phe Gly Gln Val Pro Glu Leu Arg
 2965 2970 2975
 Thr Ala Val Glu Thr Gly Pro Ala Gly Ala Tyr Trp Lys Asn Thr Leu
 2980 2985 2990
 Leu Pro Leu Glu Gln Arg Gly Val Phe Asp Ala Ala Leu Ala Arg Lys
 2995 3000 3005
 Pro Val Phe Pro Tyr Ser Val Gly Leu Tyr Pro Gly Pro Thr Cys Met
 3010 3015 3020
 Phe Arg Cys His Phe Cys Val Arg Val Thr Gly Ala Arg Tyr Asp Pro
 3025 3030 3035 3040
 Ser Ala Leu Asp Ala Gly Asn Ala Met Phe Arg Ser Val Ile Asp Glu
 3045 3050 3055
 Ile Pro Ala Gly Asn Pro Ser Ala Met Tyr Phe Ser Gly Gly Leu Glu
 3060 3065 3070
 Pro Leu Thr Asn Pro Gly Leu Gly Ser Leu Ala Ala His Ala Thr Asp
 3075 3080 3085
 His Gly Leu Arg Pro Thr Val Tyr Thr Asn Ser Phe Ala Leu Thr Glu
 3090 3095 3100
 Arg Thr Leu Glu Arg Gln Pro Gly Leu Trp Gly Leu His Ala Ile Arg
 3105 3110 3115 3120
 Thr Ser Leu Tyr Gly Leu Asn Asp Glu Glu Tyr Glu Gln Thr Thr Gly
 3125 3130 3135
 Lys Lys Ala Ala Phe Arg Arg Val Arg Glu Asn Leu Arg Arg Phe Gln
 3140 3145 3150
 Gln Leu Arg Ala Glu Arg Glu Ser Pro Ile Asn Leu Gly Phe Ala Tyr
 3155 3160 3165
 Ile Val Leu Pro Gly Arg Ala Ser Arg Leu Leu Asp Leu Val Asp Phe
 3170 3175 3180
 Ile Ala Asp Leu Asn Asp Ala Gly Gln Gly Arg Thr Ile Asp Phe Val
 3185 3190 3195 3200
 Asn Ile Arg Glu Asp Tyr Ser Gly Arg Asp Asp Gly Lys Leu Pro Gln
 3205 3210 3215
 Glu Glu Arg Ala Glu Leu Gln Glu Ala Leu Asn Ala Phe Glu Glu Arg
 3220 3225 3230
 Val Arg Glu Arg Thr Pro Gly Leu His Ile Asp Tyr Gly Tyr Ala Leu
 3235 3240 3245
 Asn Ser Leu Arg Thr Gly Ala Asp Ala Glu Leu Leu Arg Ile Lys Pro
 3250 3255 3260
 Ala Thr Met Arg Pro Thr Ala His Pro Gln Val Ala Val Gln Val Asp
 3265 3270 3275 3280
 Leu Leu Gly Asp Val Tyr Leu Tyr Arg Glu Ala Gly Phe Pro Asp Leu
 3285 3290 3295
 Asp Gly Ala Thr Arg Tyr Ile Ala Gly Arg Val Thr Pro Asp Thr Ser
 3300 3305 3310
 Leu Thr Glu Val Val Arg Asp Phe Val Glu Arg Gly Gly Glu Val Ala
 3315 3320 3325
 Ala Val Asp Gly Asp Glu Tyr Phe Met Asp Gly Phe Asp Gln Val Val
 3330 3335 3340
 Thr Ala Arg Leu Asn Gln Leu Glu Arg Asp Ala Ala Asp Gly Trp Glu
 3345 3350 3355 3360
 Glu Ala Arg Gly Phe Leu Arg Met Lys Ser Ala Leu Ser Asp Leu Ala
 3365 3370 3375
 Phe Phe Gly Gly Pro Ala Ala Phe Asp Gln Pro Leu Leu Val Gly Arg
 3380 3385 3390
 Pro Asn Arg Ile Asp Arg Ala Arg Leu Tyr Glu Arg Leu Asp Arg Ala
 3395 3400 3405
 Leu Asp Ser Gln Trp Leu Ser Asn Gly Gly Pro Leu Val Arg Glu Phe
 3410 3415 3420

Glu Glu Arg Val Ala Gly Leu Ala Gly Val Arg His Ala Val Ala Thr
 3425 3430 3435 3440
 Cys Asn Ala Thr Ala Gly Leu Gln Leu Leu Ala His Ala Ala Gly Leu
 3445 3450 3455
 Thr Gly Glu Val Ile Met Pro Ser Met Thr Phe Ala Ala Thr Pro His
 3460 3465 3470
 Ala Leu Arg Trp Ile Gly Leu Thr Pro Val Phe Ala Asp Ile Asp Pro
 3475 3480 3485
 Asp Thr Gly Asn Leu Asp Pro Asp Gln Val Ala Ala Val Thr Pro
 3490 3495 3500
 Arg Thr Ser Ala Val Val Gly Val His Leu Trp Gly Arg Pro Cys Ala
 3505 3510 3515 3520
 Ala Asp Gln Leu Arg Lys Val Ala Asp Glu His Gly Leu Arg Leu Tyr
 3525 3530 3535
 Phe Asp Ala Ala His Ala Leu Gly Cys Ala Val Asp Gly Arg Pro Ala
 3540 3545 3550
 Gly Ser Leu Gly Asp Ala Glu Val Phe Ser Phe His Ala Thr Lys Ala
 3555 3560 3565
 Val Asn Ala Phe Glu Gly Gly Ala Val Val Thr Asp Asp Ala Asp Leu
 3570 3575 3580
 Ala Ala Arg Ile Arg Ala Leu His Asn Phe Gly Phe Asp Leu Pro Gly
 3585 3590 3595 3600
 Gly Ser Pro Ala Gly Gly Thr Asn Ala Lys Met Ser Glu Ala Ala Ala
 3605 3610 3615
 Ala Met Gly Leu Thr Ser Leu Asp Ala Phe Pro Glu Val Ile Asp Arg
 3620 3625 3630
 Asn Arg Arg Asn His Ala Ala Tyr Arg Glu His Leu Ala Asp Leu Pro
 3635 3640 3645
 Gly Val Leu Val Ala Asp His Asp Arg His Gly Leu Asn Asn His Gln
 3650 3655 3660
 Tyr Val Ile Val Glu Ile Asp Glu Ala Thr Thr Gly Ile His Arg Asp
 3665 3670 3675 3680
 Leu Val Met Glu Val Leu Lys Ala Glu Gly Val His Thr Arg Ala Tyr
 3685 3690 3695
 Phe Ser Pro Gly Cys His Glu Leu Glu Pro Tyr Arg Gly Gln Pro His
 3700 3705 3710
 Ala Pro Leu Pro His Thr Glu Arg Leu Ala Ala Arg Val Leu Ser Leu
 3715 3720 3725
 Pro Thr Gly Thr Ala Ile Gly Asp Asp Asp Ile Arg Arg Val Ala Asp
 3730 3735 3740
 Leu Leu Arg Leu Cys Ala Thr Arg Gly Arg Glu Leu Thr Ala Arg His
 3745 3750 3755 3760
 Arg Asp Thr Ala Pro Ala Pro Leu Ala Ala Pro Gln Thr Ser Thr Pro
 3765 3770 3775
 Thr Ile Gly Arg Ser Arg
 3780

<210> 5

<211> 37948

<212> DNA

<213> *Streptomyces venezuelae*

<400> 5

| | | | | | | |
|------------|------------|------------|-------------|-------------|------------|-----|
| gggcccctcc | tcacgcgtct | cgatcctcgc | gcgtccgcgc | cttcccgcgc | cggcactcgc | 60 |
| gctctcgct | tcgttcaggc | cctccgcttc | cgggtcccgc | cgggtgcggct | cttcgtgctg | 120 |
| ctccggctcc | gaacggtttc | gcggagcaga | ctcatggcat | tttcccgcga | gggcggccga | 180 |
| cacgagctcg | gtcagaactt | cctcgtcgcg | cggtcagtga | tcgacgagat | cgacggcctg | 240 |
| gtggccagga | ccaagggtcc | gatactggag | atcgggtccgg | gtgacggcgc | cctgacctg | 300 |
| ccgctgagca | ggcacggcag | gccgatcacc | gccgtcgagc | tcgacggccg | gcgcgcgcag | 360 |
| cgctcggtg | cccgcacccc | cggtcatgtg | accgtggtgc | accacgactt | cctgcagtac | 420 |
| ccgctgccgc | gcaacccgca | tgtggtcgtc | ggcaacgtcc | ccttccatct | gacgacggcg | 480 |
| atcatgcggc | ggctgctcga | cgcccagcac | tggcacaccg | ccgtcctcct | cgtccagtgg | 540 |

| | | | | | | |
|-------------|------------|-------------|-------------|-------------|-------------|------|
| gaggtcgccc | ggcgccgggc | cggcgctcggc | gggtcgacgc | tgctgacggc | cggctgggcg | 600 |
| ccctggtacg | agttcgacct | gcactcccgg | gtccccgcgc | gggccttccg | tccgatgccg | 660 |
| ggcgtggacg | gaggagtact | ggccatccgg | cggcggtccg | cgccgctcgt | gggccagggtg | 720 |
| aagacgtacc | aggacttcgt | acgccagggtg | ttcaccggca | aggggaacgg | gctgaaggag | 780 |
| atcctgcggc | ggaccgggcg | gatctcgacg | cgggacctgg | cgacctggct | gcggaaggaa | 840 |
| gagatctcgc | cgcacgcgct | gccccaggac | ctgaagcccc | ggcagtgggc | gtcgtgtgg | 900 |
| gagctgaccg | gcggcacggc | cgacggatcc | ttcgacggta | cggcgggcgg | tggcgcgccc | 960 |
| ggatcgacg | gggcggctcg | ggtcggggcc | ggtcaccgcg | gcggccgggt | gtccgcgagc | 1020 |
| cggcggggcg | tgccgcaggc | gcggcgcggc | cgggggcatg | cggtacggag | ctccacgggg | 1080 |
| accgagccga | ggtggggcag | ggggcgggcg | gagagcgcg | gagccgttct | cgagcctgct | 1140 |
| gccgagccgc | tgctgagccg | gtgctgagcc | ggatccgacc | gtgggtgtga | atctccgggt | 1200 |
| gctcgccctg | tcttgcctcg | ttacctgtcc | gcctcccgct | ccagaccagc | gggaggcgga | 1260 |
| caggggcatg | cccgcggg | ggctaaccgg | cgtgcgcg | tccgtacgac | gagcctcgcg | 1320 |
| cgccctggcg | gcccctggtc | tgccggacct | gtgccccggg | tgcgagggt | tcgcccgcgc | 1380 |
| gcgtggggcc | gtatctgcgg | ctcccgggca | cggcgccct | gctcgtctcc | gagtcatagt | 1440 |
| ccctgccgccc | ggcgccaccg | ccctggcccc | gcctgcgcgt | gccgggcgccc | cccggcgcgct | 1500 |
| aactcggtcg | ggaggccctg | aaaaggggcg | tccattgggt | gagcgtgagg | tccttcggca | 1560 |
| gtccgcctgc | cggaattccg | tggcggtcgg | cgagggaacg | gtaggtccgc | ttggggatgt | 1620 |
| ggcgccggag | gatctccgcg | aggccccgtc | cggggccggt | gaagacggct | tcggcgaaat | 1680 |
| tctggaaggc | gcggtcgcgc | ctctcgggca | gcaggggctg | ggggcgctgc | ctgatcgtca | 1740 |
| ggagcccgcc | gtcgacgcgg | ggcatcgag | ggaacgacga | ggcgcgagc | cggctcgtgga | 1800 |
| cgcggaactc | gtaccagggg | gcccaggagg | tcgtgaggag | cgatccgccc | ctgcgacgg | 1860 |
| cgcgttttgcg | ggcgacctcc | cactgcacta | tcagggccgc | cgactgccag | ttcgtcgatt | 1920 |
| ccaggagact | ccggagaatc | tgggtcgtga | tgccgaaggg | aacgtttccg | acgacggtgt | 1980 |
| cgatatcgcg | cggaatgcgg | aagtcgagga | aatcaccctg | gaatacgggt | accctctccc | 2040 |
| cttcgaattt | ccgcccacac | tgcgcgcccc | agtgcgggtc | catctccacg | accgtcacgg | 2100 |
| tgtcgaagga | gcgcaccaac | tcctcggtta | tcgccccctt | tccggggccg | atttcgagaa | 2160 |
| cgttcctacc | gtccccctcg | acatgcgtga | cgagattgcg | cacggctctg | tcgtcctgaa | 2220 |
| ggaagtctcg | gcctaattcg | cggcgaaggg | tgctcgcggtc | cgctcgctc | ggtatggagt | 2280 |
| cgcgcattgc | catgaacgat | ccccctccct | gatgccgtgg | tcaatggact | tggcacggac | 2340 |
| catacctcac | ggtccgtcgg | acgaccggag | aagaagtcca | cgcacggg | ttccggagta | 2400 |
| cgggagttgt | gaacggccgc | gacgaagtgc | gtcgcggctc | ggcggg | gacgagcgag | 2460 |
| gtccggagga | acgcgacgaa | gcagccgaac | cccaagtgcg | gtgcgacgga | gtgacattgg | 2520 |
| gggcatacgg | aggggtgtcg | tacggagcgc | actcaacgag | gctccaggag | ggaggggttg | 2580 |
| aaccgcggcg | cgactggcct | tcgcccggcc | cgcggccgga | gtatgtcatg | tcgggggtga | 2640 |
| aatcaagcca | ttccccgggg | atcggtgtt | acccatccct | ttacctggcg | tggatttccc | 2700 |
| aacccttgg | atagagcggg | agacgacgcg | acaccatgga | gaccacgcac | accacgagcg | 2760 |
| ccaccccccg | gccatcccga | caaggggggt | ccggtcgcgc | tcccgaacac | catggcctgg | 2820 |
| gtacacacgc | aggtatagg | ggaacgtagg | gggagcatag | ggggggtgcc | ctgggggttg | 2880 |
| gtgaaagcgc | ggcttccgga | gacggagccg | gatgtcttca | gccggaatta | ccaggaccgg | 2940 |
| tgcgagaaca | ccggtgacag | ggcgtggggc | ggcagcgtgg | gacacggggg | aagtgcgggt | 3000 |
| ccgacggggg | ttgccccctg | ccggccccga | tcctgcggag | cactccttct | ctcgtgctcc | 3060 |
| taccggtgat | gtgcgcgcgc | aattgattcg | tggagagatg | tcgacagtgt | ccaagagtga | 3120 |
| gtccgaggaa | ttcgtgtccg | tgtcgaacga | cgcgggttcc | gcgcacggca | cagcggaacc | 3180 |
| cgtcgccgct | gtcggcatct | cctgcggggt | gcccggcgcc | cgggaccgga | gagagtctctg | 3240 |
| ggaactcctg | gcggcaggcg | gccaggccgt | caccgacgtc | cccgcggacc | gctggaacgc | 3300 |
| cggcgacttc | tacgaccg | accgctccg | ccccggccgc | tcgaacagcc | ggtggggcgg | 3360 |
| gttcacgcag | gacgtcagac | ggttcgacgc | cgccttcttc | ggcatctcgc | cccgcgaggc | 3420 |
| cgcggagatg | gaccgcagc | agcggctcgc | cctggagctg | ggctgggagg | ccctggagcg | 3480 |
| cgcggggatc | gaccgctcct | cgctcaccgg | caccgcaccc | ggcgtcttcg | ccggcgccat | 3540 |
| ctgggacgac | tacgccaccc | tgaagcaccg | ccagggcggc | gccgcgatca | ccccgcacac | 3600 |
| cgtcaccggc | ctccaccgcg | gcacatcgc | gaaccgactc | tcgtacacgc | tcgggctccg | 3660 |
| cggccccagc | atggtcgtcg | actccggcca | gtcctcgctg | ctcgtcgccg | tccacctcgc | 3720 |
| gtgcgagagc | ctgcggcgcg | gcgagtcgga | gctcgccctc | gccggcgggc | tctcgtctaa | 3780 |
| cctgggtgcc | gacagcatca | tcggggcgag | caagttcggc | ggcctctccc | ccgacggccc | 3840 |
| cgcctacacc | ttcgacgcgc | gcgccaacgg | ctacgtacgc | ggcgaggcg | gcggtttcgt | 3900 |
| cgtcctgaag | cgcctctccc | gggcgctcgc | cgacggcgac | ccggtgctcg | ccgtgatccg | 3960 |
| gggcagcgcc | gtcaacaacg | gcggcgccgc | ccagggcgatg | acgacccccg | acgcgcaggc | 4020 |
| gcaggaggcc | gtgctccg | aggcccacga | gcgggcccgg | accgcgcccg | ccgacgtg | 4080 |
| gtacgtcgag | ctgcacggca | ccggcacccc | cgtgggcgac | ccgatcgagg | ccgctgcgct | 4140 |
| cggcgccgccc | ctcggcaccg | gccgcccggc | cggacagccg | ctcctggtcg | gctcgtctaa | 4200 |
| gacgaacatc | ggccacctgg | agggcgcggc | cggcatcgcc | ggcctcatca | aggccgtcct | 4260 |

| | | | | | | |
|-------------|------------|------------|-------------|-------------|-------------|------|
| ggcgggtccgc | ggtcgcgcgc | tgcccgcag | cctgaactac | gagaccccga | acccggcgat | 4320 |
| cccgttcgag | gaactgaacc | tccgggtgaa | cacggagtag | ctgccgtggg | agccggagca | 4380 |
| cgacgggcag | cggatggtcg | tccggcgtgc | ctcgttcggc | atggggcgga | cgaacgcgca | 4440 |
| tgtcgtgctc | gaagaggccc | ccgggggttg | tcgaggtgct | tcggtcgtgg | agtcgacggt | 4500 |
| cggcgggtcg | gcggtcggcg | gcgggtgggt | gccgtgggtg | gtgtcggcga | agtcgcgtgc | 4560 |
| cgcgctggac | gcgcagatcg | agcggcttgc | cgcgctcgcc | tcgcgggatc | gtacggatgg | 4620 |
| tgtcgacgcg | ggcgctgtcg | atgcgggtgc | tgtcgatgcg | gggtgctgtcg | ctcgcgtagt | 4680 |
| ggccggcggg | cgtgctcagt | tcgagcaccg | ggcgcgtcgc | gtcggcagcg | ggccggacga | 4740 |
| tctggcggca | gcgctggccg | cgcctgaggg | tctggctccg | ggcgtggctt | ccggtgtcgg | 4800 |
| gcgagtggcg | ttcgtgttcc | ccgggcaggg | cacgcagtgg | gccggcatgg | gtgccgaact | 4860 |
| gctggactct | tccgcggtgt | tcgcggcgcc | catggccgaa | tgcgaggccg | cactctcccc | 4920 |
| gtacgtcgac | tggtcgctgg | aggccgtcgt | acggcaggcc | cccgggtgcg | ccacgctgga | 4980 |
| gcgggtcgat | gtcgtgcagc | ctgtgacgtt | cgccgtcatg | gtctcgctgg | ctcgcggtgtg | 5040 |
| gcagcaccac | gggggtgacg | cccaggcggt | cgtcggccac | tcgcaggggc | agatcgccgc | 5100 |
| cgcgtagctc | gccggtgccc | tgagcctgga | cgacgccgct | cgtgtcgtga | ccctgcgcag | 5160 |
| caagtccatc | gccgccacc | tcgccggcaa | gggcggcatg | ctgtccctcg | cgctgagcga | 5220 |
| ggacgccgtc | ctggagcgac | tggccgggtt | cgacgggctg | tccgtcgccg | ctgtgaacgg | 5280 |
| gccaccgcc | accgtggtct | ccggtgaccc | cgtacagatc | gaagagcttg | ctcgggcgtg | 5340 |
| tgaggccgat | ggggtcggtg | cgcggtcat | tcccgtcgac | tacgcgtccc | acagccggca | 5400 |
| ggtcgagatc | atcgagagcg | agctcgccga | ggctcctcgcc | gggctcagcc | cgcaggctcc | 5460 |
| gcgcgtgccg | ttcttctcga | cactcgaagg | cgctggatc | accgagcccc | tgctcgacgg | 5520 |
| cggctactgg | taccgcaacc | tgcgccatcg | tgtgggcttc | gccccggccg | tcgagacctc | 5580 |
| ggccaccgac | gagggcttca | cccacttcgt | cgaggtcagc | gcccaccccc | tcctcaccat | 5640 |
| ggccctcccc | gggaccgtca | ccggtctggc | gacctgcgt | cgcgacaacg | gcggtcagga | 5700 |
| ccgcctagtc | gcctccctcg | ccgaagcatg | ggccaacgga | ctcgcggtcg | actggagccc | 5760 |
| gctcctcccc | tccgcgaccg | gccaccactc | cgacctcccc | acctacgcgt | tccagaccga | 5820 |
| gcgccactgg | ctgggcgaga | tcgaggcgct | cgccccggcg | ggcgagccgg | cggtgcagcc | 5880 |
| cgccgtcctc | cgcacggagg | cggccgagcc | ggcggagctc | gaccgggacg | agcagctgcg | 5940 |
| cgtgatcctg | gacaaggtcc | gggcgcagac | ggcccagggtg | ctggggtagc | cgacaggcgg | 6000 |
| gcagatcgag | gtcgaccgga | ccttcctgta | ggccgggttg | acctccctga | ccggcgtgga | 6060 |
| cctgcgcaac | cggatcaacg | ccgccttcgg | cgtacgtagt | gcgccgtcca | tgatcttcga | 6120 |
| cttccccacc | ccgaggctc | tcgcggagca | gctgctcctc | gtcgtgcacg | gggaggcgcc | 6180 |
| ggcgaaccgg | gccggtgcgg | agccggctcc | ggtggcgggc | gccggtgccg | tcgacgagcc | 6240 |
| ggtggcgatc | gtcggcatgg | cctgccgcct | gcccgggtgg | gtcgccctcg | cggaggacct | 6300 |
| gtggcggtcg | gtggccggcg | gcggggacgc | gatctcggag | ttcccgcagg | accgcggctg | 6360 |
| ggacgtggag | gggctgtacc | acccggatcc | ggagcaccac | ggcacgtcgt | acgtccgcca | 6420 |
| gggcgggtttc | atcgagaacg | tcgccggctt | cgacgcggcc | ttcttcggga | tctcgcccg | 6480 |
| cgaggccctc | gcatatggac | cgcagcagcg | gctcctcctc | gaaacctcct | gggaggccgt | 6540 |
| cgaggacgcc | gggatcgacc | cgacctccct | gcggggacgg | caggtcggcg | tcttcactgt | 6600 |
| ggcgatgacc | cacgagtacg | ggccgagcct | gcgggacggc | ggggaaggcc | tcgacggcta | 6660 |
| cctgctgacc | ggcaacacgg | ccagcgtgat | gtcgggccc | gtctcgtaca | cactcggcct | 6720 |
| tgaggggcccc | gccctgacgg | tggacacggc | ctgctcgtcg | tcgctgggtcg | ccctgcacct | 6780 |
| cgccgtgcag | gccctgcgca | agggcgaggt | cgacatggcg | ctcgccggcg | gcgtggccgt | 6840 |
| gatgcccacg | cccgggatgt | tcgtcgagtt | cagccggcag | cgcgggctgg | ccggggacgg | 6900 |
| ccggtcgaag | gcgttcgccc | cgtcggcgga | cggcaccagc | tgggtccgag | gcgtcggcgt | 6960 |
| cctcctcgtc | gagcgctgt | cggacgcccc | ccgcaacgga | caccaggctc | tcgcggctcg | 7020 |
| ccgcggcagc | gccttgaacc | aggacggcgc | gagcaacggc | ctcacggctc | cgaacgggcc | 7080 |
| ctcgagcag | cgcgtcatcc | ggcgcgcgct | ggcgagcgcc | cggctgacga | cctccgacgt | 7140 |
| ggacgtcgtc | gaggcacacg | gcacgggcac | gcgactcggc | gacccgatcg | aggcgaggcc | 7200 |
| cctgatcgcc | acctacggcc | agggccgtga | cgacgaacag | ccgctgcgcc | tcgggtcgtt | 7260 |
| gaagtccaac | atcgggcaca | cccaggccgc | ggccggcgct | tccggtgtca | tcaagatggt | 7320 |
| ccaggcgatg | cgccacggac | tgctgccgaa | gacgctgcac | gtcgacgagc | cctcggacca | 7380 |
| gatcgactgg | tcggctggcg | ccgtggaact | cctcaccgag | gccgtcgact | ggccggagaa | 7440 |
| gcaggacggc | gggctgcgcc | gggcgcgct | ctcctccttc | gggatcagcg | gcaccaatgc | 7500 |
| gcatgtggtg | ctcgaagagg | ccccgggtgg | tgtcgagggg | gcttcgggtcg | tcgagccgtc | 7560 |
| ggttggcggg | tcggcggtcg | gcggcggtgt | gacgccttgg | gtggtgtcgg | cgaagtccgc | 7620 |
| tgccgcgctc | gcagcgagca | tcgagcggtt | tgccgcattc | gcctcgcggg | atcgtagcga | 7680 |
| tgacgccgac | gccggtgctg | tcgacgcggg | cgctgtcgct | cacgtactgg | ctgacggcg | 7740 |
| tgctcagttc | gagcaccggg | ccgtcgcgct | cggcgccggg | gcggacgacc | tcgtacaggc | 7800 |
| gctggccgat | ccggacgggc | tgatacgcgg | aacggcttcc | ggtgtcgggc | gagtggcgtt | 7860 |
| cgtgttcccc | ggtcagggca | cgcagtgggc | tggcatgggt | gccgaactgc | tggactcttc | 7920 |
| cgcggtgttc | gcggcgggca | tggccgagtg | tgaggccgcg | ctgtccccgt | acgtcgactg | 7980 |

| | | | | | | |
|------------|-------------|-------------|-------------|------------|-------------|-------|
| gtcgtgag | gccgtcgta | ggcaggcccc | cggtgcgccc | acgctggagc | gggtcgatgt | 8040 |
| cgtgcagcct | gtgacgttcg | ccgtcatggt | ctcgttggt | cgctgtggc | agcaccacgg | 8100 |
| tgtgacgccc | caggcggctg | tcggccactc | gcagggcgag | atcgccgccc | cgtacgtcgc | 8160 |
| cgagccctg | cccctggacg | acgccgcccc | cgctcgcacc | ctgcgcagca | agtccatcgc | 8220 |
| cggccacctc | gccggcaagg | gcggcatgct | gtccctcgcg | ctgaacgagg | acgccgtcct | 8280 |
| ggagcgactg | agtgacttcg | acgggctgtc | cgctgcgccc | gtcaacgggc | ccaccgccac | 8340 |
| tgtcgtgtcg | ggtgaccccc | tacagatcga | agagcttgct | caggcgtgca | aggcggacgg | 8400 |
| attccgcgcg | cggatcattc | ccgtcgacta | cgctgcccac | agccggcagg | tcgagatcat | 8460 |
| cgagagcgag | ctcgcccagg | tcctcgccgg | tctcagcccc | caggccccgc | gcgtgccgtt | 8520 |
| cttctcgacg | ctcgaaggca | cctggatcac | cgagcccgtc | ctcgacggca | cctactggta | 8580 |
| ccgcaacctc | cgtcacccgc | tcggcttcgc | ccccgccatc | gagaccctgg | ccgtcgacga | 8640 |
| gggcttcacg | cacttcgtcg | aggtcagcgc | ccacccgctc | ctcaccatga | ccctccccga | 8700 |
| gaccgtcacc | ggcctcgcca | ccctccgtcg | cgaacaggga | ggccaagagc | gtctggtcac | 8760 |
| ctcgtcgcgc | gaggcgtggg | tcaacgggct | tcccgtagga | tggacttcgc | tcctgcccgc | 8820 |
| cacggcctcc | cgccccggtc | tgcccaccta | cgcttccag | gccgagcgct | actggctcga | 8880 |
| gaacactccc | gccgccctgg | ccaccggcga | cgactggcgc | taccgcatcg | actggaagcg | 8940 |
| cctcccggcc | gccgaggggt | ccgagcgcac | cgccctgtcc | ggccgctggc | tcgccgtcac | 9000 |
| gccggaggac | cactccgcgc | aggccgcccgc | cgctgctcacc | gcgctggctg | acgccggggc | 9060 |
| gaaggctcag | gtgctgacgg | ccggggcgga | cgacgaccgt | gaggccctcg | ccgcccggt | 9120 |
| caccgcactg | acgaccgggt | acggcttcac | cggcgtggct | tcgctcctcg | acggactcgt | 9180 |
| accgcagctg | ggctgggtcc | aggcgctcgg | cgacgcggga | atcaaggcgc | ccctgtgggt | 9240 |
| cgtcacccag | ggcgcggtct | ccgtcggacg | tctcgacacc | cccgccgacc | ccgaccgggc | 9300 |
| catgctctgg | ggcctcgccc | gcgtcgtcgc | ccttgagcac | cccgaacgct | gggcccggct | 9360 |
| cgctgacctc | cccgcccgag | ccgatgccgc | cgccctcgcc | cacctcgtca | ccgactctc | 9420 |
| cggcgccacc | ggcgaggacc | agatcgccat | ccgcaccacc | ggactccacg | cccgcgcct | 9480 |
| cgcccgcgca | cccctccacg | gacgtcggcc | caccgcgcag | tggcagcccc | acggcaccgt | 9540 |
| cctcatcacc | ggcgggaccg | gagccctcgg | cagccacgcc | gcacgctgga | tggcccacca | 9600 |
| cggagccgaa | cacctcctcc | tcgtcagccg | cagcggcgaa | caagcccccg | gagccaccca | 9660 |
| actcaccgcc | gaactcaccg | catcgggcgc | ccgcgtcacc | atcgccgcct | gcgacgtcgc | 9720 |
| cgcacccac | ccatcgcca | ccctcctcga | cgccatcccc | gccgagacgc | ccctcaccgc | 9780 |
| cgctgtccac | accgccggcg | cgctcgacga | cggcatcgctg | gacacgctga | ccgccgagca | 9840 |
| ggtccggcgg | gccaccgctg | cgaaggccgt | cggcgccctcg | gtgctcgacg | agctgaccgg | 9900 |
| ggacctcgac | ctcgacgcgt | tcgtgctctt | ctcgtccgtg | tcgagcactc | tgggcatccc | 9960 |
| cggtcagggc | aactacgccc | cgcacaacgc | ctacctcgac | gccctcgcg | ctcgccgccc | 10020 |
| ggccaccggc | cggctccgccc | tctcgggtgg | ctggggaccg | tgggacggtg | gcggcatggc | 10080 |
| cgccggtgac | ggcgtggccg | agcggctgcg | caaccacggc | gtgcccggca | tggaccggga | 10140 |
| actcgccctg | gccgcactgg | agtccgcgct | cggccgggac | gagaccgcga | tcaccgtcgc | 10200 |
| ggacatcgac | tgggaccgct | tctacctcgc | gtactcctcc | ggtcgcccgc | agccctcgt | 10260 |
| cgaggagctg | cccgaggtgc | ggcgcatcat | cgacgcacgg | gacagcgcca | cgctccggaca | 10320 |
| gggcgggagc | tccgcccgag | ggcccaaccc | cctggccgag | cggctggccg | ccgcccgtcc | 10380 |
| cggcgagcgt | acggagatcc | tcctcgggtct | cgtaaggggc | caggccgccc | ccgtgctccg | 10440 |
| gatgcgttcg | ccggaggacg | tcgccgccga | ccgcgccttc | aaggacatcg | gcttcgactc | 10500 |
| gctcgccggt | gtcgagctgc | gcaacaggct | gaccggggcg | accgggctcc | agctgcccgc | 10560 |
| gacgctcgtc | ttcgaccacc | cgacgccgct | ggccctcgtg | tcgctgctcc | gcagcgagtt | 10620 |
| cctcggtgac | gaggagacgg | cggacgcccc | gcggctccgcg | gcgctgcccg | cgactgtcgg | 10680 |
| tgcgggtgcc | ggcgccggcg | ccggcaccga | tgccgacgac | gatccgatcg | cgatcgtcgc | 10740 |
| gatgagctgc | cgtaaccccg | gtgacatccg | cagcccgagg | gacctgtggc | ggatgtgtc | 10800 |
| cgagggcggc | gagggcacga | cgccgttccc | caccgaccgc | ggctgggacc | tcgacggcct | 10860 |
| gtacgacgcc | gaccgggacg | cgctcggcag | ggcgtacgtc | cgcgaggggc | ggttcctgca | 10920 |
| cgacgcggcc | gagttcgacg | cggagttctt | cggcgctctcg | ccgcgcgagg | cgctggccat | 10980 |
| ggaccgcag | cagcggatgc | tcctgacgac | gtcctgggag | gccttcgagc | gggcccggcat | 11040 |
| cgagccggca | tcgtgctcgcg | gcagcagcac | cggtgtcttc | atcggcctct | cctaccagga | 11100 |
| ctacgcggcc | cgctccccga | acgccccgcg | tggcgtggag | ggttacctgc | tgaccggcag | 11160 |
| cacgccgagc | gtcgctcggg | gccgtatcgc | gtacaccttc | ggtctcgaag | ggcccgcgac | 11220 |
| gaccgtcgac | accgctgct | cgtcgtcgtc | gaccgcctg | cacctggcgg | tcgggcgct | 11280 |
| gcgcagcggc | gagtcacga | tggcgctcgc | cggtagcggtg | gcgatgatgg | cgaccccgca | 11340 |
| catgttcgtg | gagttcagcc | gtcagcgggc | gctcgccccg | gacggccgca | gcaaggcctt | 11400 |
| ctcggcggac | gccgacgggt | tcggcgccgc | ggagggcgctc | ggcctgctgc | tcgtggagcg | 11460 |
| gctctcggac | gcgcggcgca | acggtcaccc | ggtgctcgc | gtggtccgcg | gtaccgccgt | 11520 |
| caaccaggac | ggcgccagca | acgggctgac | cgcgcccaac | ggaccctcgc | agcagcgggt | 11580 |
| gatccggcag | gcgctcgcgc | acgcccggt | ggcaccgggc | gacatcgacg | ccgtcgagac | 11640 |
| gcacggcacg | ggaacctcgc | tgggcgaccc | catcgaggcc | cagggcctcc | aggccacgta | 11700 |

| | | | | | | |
|-------------|-------------|------------|-------------|-------------|------------|-------|
| cggcaaggag | cggccccgcg | aacggccgct | cgccatcggc | tccgtgaagt | ccaacatcgg | 11760 |
| acacacccag | gccgcggcgg | gtgcggcggg | catcatcaag | atgggtcctcg | cgatgcgcca | 11820 |
| cggcaccctg | ccgaagaccc | tccacgccga | cgagccgagc | ccgcacgtcg | actgggcgaa | 11880 |
| cagcggcctg | gccctcgtca | ccgagccgat | cgactggccg | gccggcaccg | gtccgcgccg | 11940 |
| cgccgccgtc | tccctccttcg | gcatcagcgg | gacgaacgcg | cacgtcgtgc | tggagcaggc | 12000 |
| gccggatgct | gctgggtgagg | tgcttggggc | cgatgaggtg | cctgaggtgt | ctgagacggt | 12060 |
| agcgatggct | gggacggctg | ggacctccga | ggctcgtgag | ggctctgagg | cctccgaggc | 12120 |
| ccccgcggcc | cccggcagcc | gtgaggcgct | cctccccggg | cacctgccct | gggtgctgtc | 12180 |
| cgccaaggac | gagcagtcgc | tgcgcgggca | ggccgcggcc | ctgcacgcgt | ggctgtccga | 12240 |
| gcccgcggcc | gacctgtcgg | acgcggacgg | accggcccgc | ctgcgggacg | tcgggtacac | 12300 |
| gctcgccacg | agccgtaccg | ccttcgcgca | ccgcgcggcc | gtgaccgccc | ccgaccggga | 12360 |
| cgggttcctg | gacgggctgg | ccacgctggc | ccaggcgccg | acctcggccc | acgtccacct | 12420 |
| ggacaccgcc | cgggacggca | ccaccgcgtt | cctcttcacc | ggccagggca | gtcagcgccc | 12480 |
| cggcgccggc | cgtgagctgt | acgaccggca | ccccgtcttc | gcccggggcg | tcgacgagat | 12540 |
| ctgcgcccac | ctcgacggct | acctcgaact | gcccctgtct | gacgtgatgt | tcgcggccga | 12600 |
| gggcagcgcg | gaggccgcgc | tgctcgacga | gacgcggtac | acgcagtgcg | cgctgttcgc | 12660 |
| cctggaggct | gcgctcttcc | ggctcgtcga | gagctggggc | atgcggcccg | ccgcactgct | 12720 |
| cggtcactcg | gtcggcgaga | tcgccggccg | gcacgtcgcc | ggtgtgttct | cgctcgccga | 12780 |
| cgccgcccgc | ctggctcgccg | cgcgcgggcc | gctcatgcag | gagctgcccg | ccggtggcgc | 12840 |
| gatgctcgcc | gtccaggccg | cggaggacga | gatccgcgtg | tggctggaga | cggaggagcg | 12900 |
| gtacgcggga | cgtctggacg | tcgccgcgct | caacggcccc | gaggccgcgc | tcctgtcccg | 12960 |
| cgacgcggac | cggcgagggc | aggcgaggc | gtactggtcc | gggctcggcc | gcaggaccgg | 13020 |
| cgcgctgcgg | gtcagccacg | ccttcacctc | cgcgcacatg | gacggcatgc | tcgacgggtt | 13080 |
| ccgcgcccgt | ctggagacgg | tggagtctcc | gcgccccctc | ctgaccgtgg | tctcgaacgt | 13140 |
| caccggcctg | gccgcgggcc | cggacgacct | gtgcgacccc | gagtactggg | tcgggcacgt | 13200 |
| ccgcggcacc | gtccgcttcc | tcgacggcgt | ccgtgtcctg | cgcgacctcg | gcgtgcggac | 13260 |
| ctgcctggag | ctgggccccg | acggggctct | caccgccatg | gcggccgacg | gcctcgcgga | 13320 |
| cacccccgcg | gattccgctg | ccggctcccc | cgctcggtct | cccgcgggct | ctcccgcgga | 13380 |
| ctccgcgcgc | ggcgcgctcc | ggccccggcc | gctgctcgtg | gcgctgctgc | gccgcaagcg | 13440 |
| gtcggagacc | gagaccgtcg | cggacgcctc | cggcaggggc | cacgcccacg | gcaccggacc | 13500 |
| cgactggcac | gcctggctcg | ccggctccgg | ggcgaccgcg | gtggacctgc | ccacgtactc | 13560 |
| cttcgggcgc | gaccgctact | ggctggacgc | cccgcgggcc | gacaccgcgg | tggacaccgc | 13620 |
| cggcctcggt | ctcggcaccg | ccgaccaccc | gctgctcggc | gccgtggtca | gccttcgga | 13680 |
| ccgggacggc | ctgctgctca | ccggccgcct | ctccctgcgc | acccaccctg | ggctcgcgga | 13740 |
| ccacgccgtc | ctggggagcg | tcctgctccc | cggcgccgcg | atggctgaac | tcgccgcgca | 13800 |
| cgtgcgggag | tcggccgggtc | tgctgacgt | gcgggagctg | accctccttg | aaccgctggt | 13860 |
| actgcccag | cacgggtggcg | tcgagctgcg | cgtgacggtc | ggggcgccgg | ccggagagcc | 13920 |
| cggtagggag | tcggccgggg | acggcgacg | gcccgtctcc | ctccactcgc | ggctcgccga | 13980 |
| cgcgcccgcc | ggtaccgctc | ggtcctgcca | cgcgaccggt | ctgctggcca | ccgaccggcc | 14040 |
| cgagcttccc | gtcgcgcccc | accgtgcggc | catgtggccg | ccgagggcg | ccgaggaggt | 14100 |
| gccgctcgac | ggtctctacg | agcggctcga | cgggaacggc | ctcgccttcg | gtccgctggt | 14160 |
| ccaggggctg | aacgcgggtg | ggcggtagca | gggtgaggtc | ttcgccgaca | tcgcgctccc | 14220 |
| cgccaccacg | aatgcgaccg | cgcggcgac | cgcgaacggc | ggcgggagtg | cggcgggcgg | 14280 |
| ccctacggc | atccaccccc | ccctgctcga | cgttcgctg | cacgccatcg | cggtcggcgg | 14340 |
| tctcgtcgac | gagccccagc | tcgtccgcgt | ccccctccac | tggagcggtg | tcaccgtgca | 14400 |
| cgcggccggg | gccgcggcgg | cccgggtccg | tctcgctccc | gcggggagcg | acgccgtctc | 14460 |
| gctgtccctg | acggacggcg | agggacgccc | gctggctccc | gtggaacggc | tcacgtgctg | 14520 |
| cccgtcacc | gccgatcagg | cggcggcgag | ccgcgtggcg | gggctgatgc | accgggtggc | 14580 |
| ctggcgctcc | tacgccctcg | cctcgtccgg | cgaacaggac | ccgcacgcca | cttcgtacgg | 14640 |
| gccgaccgcc | gtcctcggca | aggacgagct | gaaggtcgcc | gccgccctgg | agtccgcggg | 14700 |
| cgtcgaagtc | gggctctacc | ccgacctggc | cgcgctgtcc | caggacgtgg | cggccggcgc | 14760 |
| ccggcgcccc | cgtaccgtcc | ttgcgcgcgt | gcccgcgggt | cccgcggacg | gcggcgcgga | 14820 |
| gggtgtacgg | ggcacgggtg | cccggacgct | ggagctgctc | caggcctggc | tggccgacga | 14880 |
| gcacctcgcg | ggcaccggcc | tgctcctggt | caccgcgggt | gcgggtgcggg | accccagagg | 14940 |
| gtccggcgcc | gacgatggcg | gcgaggacct | gtcgcacgcg | gccgcctggg | gtctcgtacg | 15000 |
| gaccgcgcag | accgagaacc | ccggccgctt | cggccttctc | gacctggccg | acgacgcctc | 15060 |
| gtcgtaccgg | acctgaccgt | cgggtgctct | cgcgctgggc | ctgcgcgacg | aaccgcagct | 15120 |
| cgccctgcac | gacggcacca | tcaggctggc | ccgcctggcc | tccgtccggc | ccgagaccgg | 15180 |
| caccgcccga | ccggcgctcg | ccccggaggg | cacggctcctg | ctgaccggcg | gcaccggcgg | 15240 |
| cctgggcccga | ctggctcgccc | ggcacgtggt | gggcgagtg | ggcgtagcac | gcctgctgct | 15300 |
| ggtgagccgg | cggggcacgg | acgccccggg | cgcgcgacgag | ctcgtgcacg | agctggaggc | 15360 |
| cctgggagcc | gacgtctcgg | tggccgcgtg | cgacgtcgcc | gaccgcgaag | ccctcaccgc | 15420 |

| | | | | | | |
|-------------|-------------|-------------|------------|-------------|------------|-------|
| cgtactcgac | gccatccccg | ccgaacaccc | gctcaccgcg | gtcgtccaca | cggcaggcgt | 15480 |
| cctctccgac | ggcaccctcc | cgctccatgac | gacggaggac | gtggaacacg | tactgcggcc | 15540 |
| caaggtcgac | gcccgcgttcc | tcctcgacga | actcacctcg | acgcccgcac | acgacctggc | 15600 |
| agcgttcgtc | atgtttctct | ccgcgcgcgc | cgtcttcggg | ggcgcggggc | agggcgccca | 15660 |
| cgccgcccgc | aacgccaccc | tcgacgccct | cgccctggcg | cgccgggcag | ccggactccc | 15720 |
| cgccctctcc | ctcggctggg | gcctctgggc | cgagaccagc | ggcatgaccg | gcgagctcgg | 15780 |
| ccaggcggac | ctgcgcggga | tgagccgcgc | gggcatcggc | gggatcagcg | acgccgaggg | 15840 |
| catcgcgctc | ctcgacgccg | ccctccgcga | cgaccgccac | ccggtcctgc | tgcccctgcg | 15900 |
| gctcgacgcc | gccgggctgc | gggacgcggc | cggaacgcac | ccggccggaa | tcccggcgct | 15960 |
| cttccgggac | gtcgtcggcg | ccaggaccgt | ccgggcccgg | ccgtccgcgg | cctccgcctc | 16020 |
| gacgacagcc | gggacggccg | gcacgcgggg | gacggcggac | ggcgcggcgg | aaacggcggc | 16080 |
| ggtcacgctc | gccgaccggg | ccgccaccgt | ggacggggcc | gcacggcagc | gcctgctgct | 16140 |
| cgagttcgtc | gtcggcgagg | tcgccgaagt | actcggccac | gcccgcggtc | accggatcga | 16200 |
| cgcggaacgg | ggcttcctcg | acctcggtt | cgactccctg | accgccgtcg | aactccgcaa | 16260 |
| ccggctcaac | tccgccgggtg | gcctcgccct | ccggcgacc | ctggtcttcg | accaccaag | 16320 |
| cccggcggca | ctcgctccc | acctggacgc | cgagctgccg | cgcgcgccct | cggaccagga | 16380 |
| cggagccggg | aaccggaacg | ggaacgagaa | cgggacgacg | gcgtcccggg | gcaccgccga | 16440 |
| gacggacgcg | ctgctggcac | aactgaccgc | cctggaaggc | gccttggtgc | tgacgggcct | 16500 |
| ctcggacgcc | cccgggagcg | aagaagtcc | ggagcacctg | cggccccctg | gctcgatggt | 16560 |
| cacgggcgag | accgggaccg | ggaccgcgtc | cggagccccg | gacggcgccg | ggtccggcgc | 16620 |
| cgaggaccgg | ccctgggcgg | ccggggacgg | agccgggggc | gggagtgagg | acggcgcggg | 16680 |
| agtgcgggac | ttcatggaac | cctcgccga | ggaactcttc | ggcctcctcg | accaggacc | 16740 |
| cagcacggac | tgatccctgc | cgcacggctc | ccctccgcc | cggaccccgt | cccgggcacc | 16800 |
| tcgactcgaa | tactttcatg | cgcgctcgg | gcgcctccag | gaactcaagg | ggacagcgtg | 16860 |
| tccacggtga | acgaagagaa | gtacctcgac | tacctgcgtc | gtgccacggc | ggacctccac | 16920 |
| gaggcccggtg | gccgcctccg | cgagctggag | gcgaaggcgg | gcgagccggt | ggcgatcgct | 16980 |
| ggcatggcct | gccgcctgcc | cggcggcgtc | gcctcgcccg | aggacctgtg | gcggctggtg | 17040 |
| gccggcggcg | aggacgcgat | ctcggagttc | ccccaggacc | gcggctggga | cgtggagggc | 17100 |
| ctgtacgacc | cgaacccgga | ggccacgggc | aagagttacg | cccgcgaggc | cggattcctg | 17160 |
| tacgagccgg | gcgagttcga | cgccgacttc | ttcgggatct | cgccgcgcga | ggccctcgcc | 17220 |
| atggaccccg | agcagcgtct | ctcctggag | gcctcctggg | aggcgttcga | gcacgccggg | 17280 |
| atcccggcgg | ccaccgcgcg | cggcacctcg | gtcggcgctc | tcaccggcgt | gatgtaccac | 17340 |
| gactacgcca | cccgtctcac | cgatgtccc | gagggcacgc | agggtacct | gggcaccggc | 17400 |
| aactccggca | gtgtcgctc | gggcccgcgc | gcgtacacgc | ttggcctgga | ggggccggcc | 17460 |
| gtcacggtcg | acaccgcctg | ctcgtcctcg | ctggtcgccc | tgacactcgc | cgtgcaggcc | 17520 |
| ctgcgcaagg | gcgaggtcga | catggcgctc | gccggcgcg | tgacggtcat | gtcgacgcc | 17580 |
| agcaccttcg | tcgagttcag | ccgtcagcgc | gggtggcg | cggacggccg | gtcgaagtcc | 17640 |
| ttctcgtcga | cggccgacgg | caccagctgg | tccgagggcg | tcggcgctct | cctcgtcgag | 17700 |
| cgccgtgtccg | acgcgcgtcg | caagggccat | cggatcctcg | ccgtggctcg | gggcaccgcc | 17760 |
| gtcaaccagg | acggcgccag | cagcggcctc | acgggtccga | acgggcccgtc | gcagcagcgc | 17820 |
| gtcatccgac | gtgccctggc | ggacgcggcg | ctcacgacct | ccgacgtgga | cgtcgtcgag | 17880 |
| gcccacggca | cgggtacgcg | actcggcgac | ccgatcgagg | cgcaggccgt | catcgccacg | 17940 |
| tacgggcagg | gccgtgacgg | cgaacagccg | ctgcgcctcg | ggtcgttgaa | gtccaacatc | 18000 |
| ggacacaccc | aggccgcgcg | cgggtgtctc | ggcgtgatca | agatggtcca | ggcgatgcgc | 18060 |
| cacggcgctc | tgcggaagac | gctccacgtg | gagaagccga | cggaccaggt | ggactggtcc | 18120 |
| gcgggcgcgg | tcgagctgct | caccgaggcc | atggactggc | cggacaaggg | cgacggcgga | 18180 |
| ctgcgcaggg | ccgcggtctc | ctccttcggc | gtcagcggga | cgaacgcgca | cgtcgtgctc | 18240 |
| gaagaggccc | cggcgggcca | ggagaccctt | gcctccgagg | cgaccccggc | cgtcgagccg | 18300 |
| tcggctcggcg | ccggcctggg | gccgtggctg | gtgtcggcga | agactccggc | cgcgctggac | 18360 |
| gcccagatcg | gacgcctcgc | cgcgctcgcc | tcgcaggggc | gtacggacgc | cgccgatccg | 18420 |
| ggcgcggctc | ctcgcgtact | ggccggcggg | cgcgccgagt | tcgagcaccg | ggccgtcgtg | 18480 |
| ctcggcaccg | gacaggacga | tttcgcgcag | gcgtgaccg | ctccggaagg | actgatacgc | 18540 |
| ggcacgccct | cggacgtggg | ccgggtggcg | ttcgtgttcc | ccggtcaggg | cacgcagtgg | 18600 |
| gccgggatgg | gcgcggaact | cctcgacgtg | tcgaaggagt | tcgcggcggc | catggccgag | 18660 |
| tgcgagagcg | cgctctcccg | ctatgtcgac | tggtcgctgg | aggccgtcgt | ccggcaggcg | 18720 |
| ccgggcgcgc | cgggctgga | gcgggtcgac | gtcgtccagc | ccgtgacctt | cgtgtcctc | 18780 |
| gtttcgctgg | cgaaggctcg | gcagcaccac | ggcgtgacgc | cgcaggccgt | cgtcgccac | 18840 |
| tcgcaggggc | agatcgccgc | cgcgctacgtc | gccgggtgcc | tcaccctcga | cgacgccgcc | 18900 |
| cgcgtcgta | ccctgcgcag | caagtccatc | gccgccacc | tcgccggcaa | gggcggcatg | 18960 |
| atctccctcg | ccctcagcga | ggaagccacc | cggcagcgca | tcgagaacct | ccacggactg | 19020 |
| tcgatcgccg | ccgtcaacgg | ccccaccgcc | accgtgggtt | cgggcgaccc | caccagatc | 19080 |
| caagagctcg | ctcaggcggtg | tgaggccgac | ggggtccgcg | cacggatcat | ccccgtcgac | 19140 |

| | | | | | | |
|-------------|------------|-------------|------------|------------|-------------|-------|
| tacgcctccc | acagcgccca | cgtcgagacc | atcgagagcg | aactcgccga | ggctcctcgcc | 19200 |
| gggctcagcc | cgcggaacac | tgaggtgccc | ttcttctcga | cactcgaagg | cgctgggac | 19260 |
| accgagcccg | tgctcgacgg | cacctactgg | taccgcaacc | tccgccaccg | cgtcggcttc | 19320 |
| gccccgccc | tcgagacctt | cgccaccgac | gaaggcttca | cccacttcat | cgaggtcagc | 19380 |
| gcccaccccc | tcctcaccat | gacctcctcc | gagaccgtca | ccggcctcgg | cacctccgc | 19440 |
| cgcgaaacagg | gaggccagga | gcgtctggtc | acctactcgc | ccgaagcctg | gaccaacggc | 19500 |
| ctcaccatcg | actgggccc | cgctctcccc | accgcaaccg | gccaccacc | cgagctcccc | 19560 |
| acctacgcct | tccagcgccc | tcactactgg | ctccacgact | cccccgccgt | ccagggctcc | 19620 |
| gtgcaggact | cctggcgcta | ccgcatcgac | tggaagcgcc | tcgcggtcgc | cgacgcgtcc | 19680 |
| gagcgcgccg | ggctgtccgg | gcgctggctc | gtcgtcgtcc | ccgaggaccg | ttccgccgag | 19740 |
| gccgccccgg | tgctcgccgc | gctgtccggc | gccggcgccg | accccgta | gctggacgtg | 19800 |
| tccccgctgg | gcgaccggca | gcggctcgcc | gcgagcgtgg | gcgaggccct | ggcgggcgcc | 19860 |
| ggtggagccg | tcgacggcgt | cctctcgctg | ctcgctgggg | acgagagcgc | gcaccccgcc | 19920 |
| caccccgccc | ccttcacccg | gggcaccggc | gccaccttca | ccctgggtga | ggcgctggag | 19980 |
| gacgcccggc | tcgcccgc | gctgtgggtc | gtgacccacg | gcgcggtgtc | cgtcggccgg | 20040 |
| gccgaccacg | tcacctcccc | cgcccaggcc | atgggtgtgg | gcatgggccc | ggtcgcgcgc | 20100 |
| ctggagcacc | ccgagcggtg | gggcggcctg | atcgacctgc | cctcggaacg | cgaccgggcg | 20160 |
| gccctggacc | gcatgaccac | ggctcctcgcc | ggcggtacgg | gtgaggacca | ggtcgcggta | 20220 |
| cgcgccctcc | ggctgctcgc | ccgcccgcct | gtccgcgcct | ccctcccggc | gcacggcacg | 20280 |
| gcttcgcccgt | ggtggcaggc | cgacggcacg | gtgctcgtca | ccggtgccga | ggagcctgcg | 20340 |
| gccgcccagg | cgcacgcgcg | gctggcccgc | cagcgccgcg | gacacctcct | cctccacacc | 20400 |
| acccccctcg | gcgaggaagg | cgccgaaggc | acctccggtg | ccgcccagga | ctccggcctc | 20460 |
| gccgggctcg | tcgccaact | cgcgacactg | ggcgcgacgg | ccaccgtcgt | gacctgcgac | 20520 |
| ctcacggacg | cgaggcgggc | cgcccggctg | ctcgccggcg | tctccgacgc | gcacccgctc | 20580 |
| agcgccgtcc | tccacctgcc | gcccaccgtc | gactccgagc | cgctcgccgc | gaccgacgcg | 20640 |
| gacgcgctcg | cccggtgctg | gaccgcgaag | gccaccgccc | cgctccacct | ggaccgcctc | 20700 |
| ctgcgggagg | ccgcggtcgc | cggaggccgt | ccgcccgtcc | tggtcctctt | ctcctcggtc | 20760 |
| gccgcgatct | ggggcgggcg | cggtcagggc | gcgtacgccc | ccggtacggc | cttcctcgac | 20820 |
| gccctcgccg | gtcagcaccg | ggccgacggc | cccaccgtga | cctcggtggc | ctggagcccc | 20880 |
| tgggagggca | gccggtcac | cgagggtgcg | accggggagc | ggctgcgccc | cctcggcctg | 20940 |
| cgccccctcg | cccccgcgac | ggcgctcacc | gccctggaca | ccgcgctcgg | ccacggcgac | 21000 |
| accgcccgtca | cgatcgccga | cgctcgactg | tcgagcttcg | cccccggtt | caccacggcc | 21060 |
| cgggccgggca | ccctcctcgc | cgatctgccc | gaggcgcgcc | gcgcgctcga | cgagcagcag | 21120 |
| tcgacgacgg | ccgcccagca | caccgtcctg | agccgcgagc | tcggtgcgct | caccggcgcc | 21180 |
| gaacagcagc | gccgtatgca | ggagtgggtc | cgcgagcacc | tcgccgtggg | cctcaaccac | 21240 |
| ccctcccccg | aggccgtcga | cacggggcgg | gccttcctgt | acctcggatt | cgactcgctg | 21300 |
| acggcggtcg | agctccgcaa | ccgcctcaag | aacgccaccg | gcctggccct | cccgccact | 21360 |
| ctggtcttcg | actaccgac | cccccgagc | ctggcgaggt | tctcctcgc | ggagatcctg | 21420 |
| cgcgagcagg | ccggtgcggg | cgagcagctt | ccggtggacg | gcggggctga | cgacgagccc | 21480 |
| gtcgcgatcg | tcggcatggc | gtgccgcctg | ccgggcgggt | tcgcctcgcc | ggaggacctg | 21540 |
| tggcggtcgg | tggccggcgg | cgaggacgcg | atctccggct | tcccgagga | ccgcggtcgg | 21600 |
| gacgtggagg | ggctgtacga | cccggaccgc | gacgcgtccg | ggcggaacga | ctgccgtgcc | 21660 |
| ggtggcttcc | tcgacgaggg | gggcgagttc | gacgccgact | tcttcgggat | ctcgccgcgc | 21720 |
| gaggccctcg | ccatggaccc | gcagcagcgg | ctcctcctgg | agacctcctg | ggaggccgtc | 21780 |
| gaggacgccc | ggatcgaccc | gacctccctt | caggggacgc | aggtcggcgt | gttcgcgggc | 21840 |
| accaacggcc | cccactacga | gccgctgctc | cgcaacaccg | ccgaggatct | tgagggttac | 21900 |
| gtcgggagcg | gcaacgcgcg | cagcatcatg | tcgggcccgt | tctcgtacac | cctcggcctg | 21960 |
| gagggcccgg | ccgtcacggg | cgacaccgcc | tgctcctcct | cgctggctcg | cctgcacctc | 22020 |
| gccgtgcagg | ccctgcgcaa | gggcgaatgc | ggactggcgc | tcgcgggcgg | tgtgacggtc | 22080 |
| atgtcgacgc | ccacgacgtt | cgtggagttc | agccggcagc | gcgggctcgc | ggaggacggc | 22140 |
| cggtcgaagg | cgttcgccgc | gtcggcgga | ggcttcggcc | cgcgaggagg | cgtcggcatg | 22200 |
| ctcctcgctc | agcgccgtgc | ggacgcccgc | cgcaacggac | accgtgtgct | ggcggtcgtg | 22260 |
| cgcggcagcg | cggtcaacca | ggacggcgcg | agcaacggcc | tgaccgcccc | gaacgggccc | 22320 |
| tcgacgagc | gcgtcatccg | gcgcgcgctc | gcggacgccc | gactgacgac | cgccgacgtg | 22380 |
| gacgtcgtcg | aggcccacgg | cacgggcacg | cgactcggcg | acccgatcga | ggcacaggcc | 22440 |
| ctatcgcca | cctacggcca | ggggcgcgac | accgaacagc | cgctgcgcct | ggggtcgttg | 22500 |
| aagtccaaca | tcggacacac | ccaggccgcc | gccggtgtct | ccggcatcat | caagatggtc | 22560 |
| caggcgatgc | gccacggcgt | cctgccgaag | acgctccacg | tggaccggcc | gtcggaccag | 22620 |
| atcgactggg | cggcgggcac | ggtcgagctg | ctcaccgagg | ccatggactg | gccgaggaag | 22680 |
| caggagggcg | ggctgcgccc | cgcgcccgtc | tctccttcg | gcatcagcgg | cacgaacgcg | 22740 |
| cacatcgtgc | tcgaagaagc | cccgttcgac | gaggacgccc | cggcggacga | gccgtcggtc | 22800 |
| ggcggtgtgg | tgccgtggct | cgtgtccgcg | aagactccgg | ccgcgctgga | cgcccagatc | 22860 |

| | | | | | | |
|-------------|-------------|-------------|-------------|-------------|-------------|-------|
| ggacgcctcg | ccgcgttcgc | ctcgcagggc | cgtacggacg | ccgccgatcc | gggcgcggtc | 22920 |
| gctcgcgtac | tggccggcgg | gcgtgcgcag | ttcagacacc | gggcgcgtcg | gctcggcacc | 22980 |
| ggacaggacg | acctggcggc | cgcactggcc | gcgcctgagg | gtctgggtccg | gggtgtggcc | 23040 |
| ttcgggtgtg | ctcagtgggc | gttcgtgttc | ccgggacagg | gcacgcagtg | ggccgggatg | 23100 |
| gggtgccgaac | tcctcgacgt | gtcgaaggag | ttcgcggcgg | ccatggccga | gtgcgaggcc | 23160 |
| gcgctcgctc | cgtacgtgga | ctggtcgctg | gaggccgtcg | tcgcacaggc | ccccggcgcg | 23220 |
| cccacgctgg | agcgggtcga | tgtcgtccag | cccgtgacgt | tcgccgtcat | ggtctcgtcg | 23280 |
| gcgaaggtct | ggcagcacca | cggggtgacc | ccgcaagccg | tcgtcggcca | ctcgcagggc | 23340 |
| gagatcgccg | ccgcgtacgt | cgcgggtgcc | ctgagcctgg | acgacgccgc | tcgtgtcggtg | 23400 |
| accctgcgca | gcaagtccat | cggcgccccac | ctcgcggggc | agggcgccat | gctgtccctc | 23460 |
| gcgctgagcg | aggcgggcgt | tgtggagcga | ctggccgggt | tcgacgggct | gtccgtcgcc | 23520 |
| gccgtcaacg | ggcctaccgc | caccgtgggt | tcgggcgacc | cgaccagat | ccaagagctc | 23580 |
| gctcaggcgt | gtgaggccga | cggggtccgc | gcacggatca | tccccgtcga | ctacgcctcc | 23640 |
| cacagcgccc | acgtcgagac | catcgagagc | gaactcgccg | acgtcctggc | gggggtgtcc | 23700 |
| ccccagacac | cccagggtccc | cttctttctc | accctcgaag | gcgcctggat | caccgaaccc | 23760 |
| gccctcgacg | gcggctactg | gtaccgcaac | ctccgccatc | gtgtgggctt | cgccccggcc | 23820 |
| gtcgaaaccc | tggccaccga | cgaaggcttc | accacttcg | tcgaggtcag | cgcccccccc | 23880 |
| gtcctcacca | tggcgctgcc | cgagaccgtc | accggactcg | gcaccctccg | ccgtgacaac | 23940 |
| ggcggacagc | accgcctcac | cacctccctc | gccgaggcct | gggccaacgg | cctcacccgc | 24000 |
| gactgggctc | ctctcctccc | caccacgacc | acccaccccc | atctgcccac | ctacgccttc | 24060 |
| cagaccgcgc | gctactggcc | gcagcccgcg | ctctccgccg | ccggtgacat | cacctccgcc | 24120 |
| gggtctcgggg | cggccgagca | cccgtgtctc | ggcgcggccg | tggcgctcgc | ggactccgac | 24180 |
| ggctgcctgc | tcacggggag | cctctccctc | cgtacgcacc | cctggctggc | ggaccacgcg | 24240 |
| gtggccggca | ccgtgctgct | gccgggaacg | gcgttcgtgg | agctggcgct | ccgagccggg | 24300 |
| gaccaggtcg | gttgcgatct | ggtcgaggag | ctcaccctcg | acgcgccgct | cgtgctgccc | 24360 |
| cgtcgtggcg | cggctccgtgt | gcagctgtcc | gtcggcgcca | gcgacgagtc | cgggcgctcg | 24420 |
| accttcgggc | tctacgcgca | cccggaggac | gcgcggggcg | aggcgaggatg | gacgcggcac | 24480 |
| gccaccgggtg | tgtggccgcg | ccgtgcggac | cgcaccgccc | ccgtcgccga | cccggaggcc | 24540 |
| tggccgcgcg | cgggcgccga | gccgggtggc | gtggacgggtc | tgtacgagcg | cttcgcggcg | 24600 |
| aacggctacg | cctctccccc | cctctccagc | ggcgctccgtg | gtgtctggcg | gcgtggcgac | 24660 |
| gaggtgttcg | ccgacgtggc | cctgcggccc | gaggtcgccc | gtgccgaggg | cgcgcggttc | 24720 |
| ggccttcacc | cggcgctgct | cgacgccgcc | gtgcaggcgg | ccggtgcggg | ccggggcgct | 24780 |
| cggcgcgggc | acgcggctgc | cgttcgcctg | gagcgggatc | tcctgtacgc | ggtcggcgcc | 24840 |
| accgccctcc | gcgtgcggct | ggcccccgcc | ggccccgaca | ccgtgtccgt | gagcgccgcc | 24900 |
| gactcctccg | ggcagccggt | gttcgcgcgc | gactccctca | ccgtgtctgcc | cgtcgacccc | 24960 |
| gcgcagctgg | cggccttcag | cgacccgact | ctggacgcgc | tgcacctgct | ggagtggacc | 25020 |
| gctggggacg | gtgccgcgca | ggccttgccc | ggcgcggtcg | tgtggggcgg | cgacgccgac | 25080 |
| ggtctcgccg | aggcgctgcg | cgcgggtggc | accgaggtcc | tgtccttccc | ggaccttacg | 25140 |
| gacctggtgg | agggcgtcga | ccggggcgag | accccgggcc | cggcgaccgt | cctggtggcc | 25200 |
| tgccccgcgc | ccggccccga | tgggcgggag | catgtccgcg | aggccctgca | cgggtcgctc | 25260 |
| gcgctgatgc | aggcctggct | ggccgacgag | cggttcaccg | atgggcgcct | ggtgctcggtg | 25320 |
| acccgcgacg | cggtcgccgc | ccgttcgggc | gacggcctgc | ggtccacggg | acaggccgcc | 25380 |
| gtctggggcc | tcggccgggtc | cgcgcagacg | gagagcccgg | gccggttcgt | cctgctcgac | 25440 |
| ctcgccgggg | aagcccggac | ggccggggac | gccaccgccc | gggacggcct | gacgaccggg | 25500 |
| gacgccaccg | tcggcgggcac | ctctggagac | gccgcctcgt | gcagcgccct | cgcgaccgcc | 25560 |
| ctcggtcgg | gcgagccgca | gctcgccctc | cgggacgggg | cgctcctcgt | accccgccctg | 25620 |
| gcgcggggcg | ccgcgcccgc | cgcggccgac | ggcctcgccg | cggccgacgg | cctcgccgct | 25680 |
| ctgccgctgc | ccgcgcctcc | ggccctctgg | cgtctggagc | ccggtacgga | cggcagcctg | 25740 |
| gagagcctca | cggcgggcgcc | cggcgacgcc | gagaccctcg | ccccggagcc | gctcggccccg | 25800 |
| ggacaggtcc | gcatcgcgat | ccgggccacc | ggtctcaact | tcgcgcagct | cctgatcgcc | 25860 |
| ctcggcatgt | accccgatcc | ggcgctgatg | ggcaccgagg | gagccggcgt | ggtcaccgcg | 25920 |
| accggccccg | gcgtcacgca | cctcgccccc | ggcgaccggg | tcatgggcct | gctctccggc | 25980 |
| gcgtacgccc | cggctcgtcgt | ggcggacgcg | cggaccgtcg | cgcggatgcc | cgaggggtgg | 26040 |
| acgttcgccc | agggcgcttc | cgtgccgggtg | gtgttcctga | cggccgtcta | cgccctgcgc | 26100 |
| gacctggcgg | acgtcaagcc | cggcgagcgc | ctcctggctc | actccgcgcg | cgggtggcgtg | 26160 |
| ggcatggccg | cgtgcagct | cggccggcac | tggggcgctg | aggtccacgg | cacggcgagt | 26220 |
| cacgggaagt | gggacgcctc | gcgcgcgctc | ggcctggacg | acgcgcacat | cgctcctcc | 26280 |
| cgcaccctgg | acttcgagtc | cgcgttcctg | gccgcttcgc | gcggggcggg | catggacgtc | 26340 |
| gtactgaact | cgctcgcccc | cgagttcgtc | gacgcctcgc | tgcgcctgct | cgggccggggc | 26400 |
| ggccgggttcg | tggagatggg | gaagaccgac | gtccgcgacg | cggagcgggt | cgccgcgcgac | 26460 |
| caccccggtg | tcggctaccg | cgccttcgac | ctgggcgagg | ccgggcggga | gcggatcggc | 26520 |
| gagatgctcg | ccgaggtcat | cgcctctctc | gaggacgggg | tgtctcggca | cctgcccgcgc | 26580 |

| | | | | | | |
|-------------|------------|-------------|-------------|-------------|-------------|-------|
| acgacctggg | acgtgcgccg | ggccccgcgac | gccttcgggc | acgtcagcca | ggccccccac | 26640 |
| acggggcaagg | tcgtcctcac | gatgcgctcg | ggcctcgacc | cggaggggtac | ggtcctgctg | 26700 |
| accggcgcca | ccggtgctgt | ggggggcatc | gtggccccgc | acgtgggtggg | cgagtggggc | 26760 |
| gtacgacgcc | tgctgctcgt | gagccggcgg | ggcacgcgag | ccccggggcg | cggcgagctc | 26820 |
| gtgcacgagc | tggaggccct | gggagccgac | gtctcggtgg | ccgctgctga | cgctgccgac | 26880 |
| cgcgaagccc | tcaccgcctg | actcgactcg | atccccgcgc | aacaccgcct | caccgcggtc | 26940 |
| gtccacacgg | caggcgtcct | ctccgacggc | accctccccct | cgatgacagc | ggaggatgtg | 27000 |
| gaacacgtac | tgctcccaa | ggtcgacgcc | gcgttcctcc | tcgacgaact | cacctcgacg | 27060 |
| cccggctacg | acctggcagc | gttcgtcatg | ttctcctccg | ccgccgccgt | cttcgggtggc | 27120 |
| gcgggggcagg | gcgcctacgc | cgcgcgccaac | gccaccctcg | acgccctcgc | ctggcgccgc | 27180 |
| cggacagccg | gactccccgc | cctctccctc | ggctggggcc | tctggggcga | gaccagcggc | 27240 |
| atgaccggcg | gactcagcga | caccgaccgc | tcgcggtctg | cccgcttcgg | ggcgacgccc | 27300 |
| atggacagcg | agctgaccct | gtccctcctg | gacgcggcca | tgccgcgcga | cgaccgcggc | 27360 |
| ctcgtccccg | tcgccttgga | cgctgcgcgc | ctccgcgcgc | agcagcgcca | cggcatgctg | 27420 |
| gcgccgctgc | tcagcgggct | caccgcggga | tcgcggtctg | gcgggcgccc | ggtcaaccag | 27480 |
| cgcagggcag | ccgcgggagg | cgcggggcag | gcggaacagg | acctcggcgg | gcggctcgcc | 27540 |
| gcgatgacac | cggacgaccg | ggtcgcgcac | ctgcgggacc | tcgtccgtac | gcacgtggcg | 27600 |
| accgtcctgg | gacacggcac | cccagagccg | gtggacctgg | agcgggcctt | ccgcgacacc | 27660 |
| ggtttcgact | cgctcacgcg | cgctgaactc | cgcaaccgtc | tcaacgcgcg | gaccgggctg | 27720 |
| cggctgcccg | ccacgtgggt | cttcgaccac | cccaccccgg | gggagctcgc | cgggcacctg | 27780 |
| ctcgacgaac | tcgccacggc | cgcggggcgg | tcctgggcgg | aaggcaccgg | gtccggagac | 27840 |
| acggcctcgg | cgaccgatcg | gcagaccatg | cgggcctcgc | ccgaactcga | ccggctggaa | 27900 |
| ggcgtgctcg | cctccctcgc | gcccgcgcgc | ggcgccgctc | cggagctcgc | cgcccggctc | 27960 |
| agggcgctgg | ccgcggccct | gggggacgac | ggcgacgacg | ccaccgacct | ggacgaggcg | 28020 |
| tccgacgacg | acctcttctc | cttcacgcac | aaggagctgg | gcgactccga | cttctgacct | 28080 |
| gcccgcacac | accggcacca | ccggcaccac | cagccccctt | cacacacgga | acacggaacg | 28140 |
| gacagggcag | aacgggagcc | atggcgaaac | acgaagacaa | gctccgcgac | tacctcaagc | 28200 |
| gcgtcacccg | cgagctgcag | cagaacacca | ggcgtctgcg | cgagatcgag | ggacgcacgc | 28260 |
| acgagccggg | ggcgatcgtg | ggcatggcct | gccgcctgcc | gggcggtgtc | gcctcgcccc | 28320 |
| aggacctgta | gcagctgggt | gccggggacg | gggacgcgat | ctcggagttc | ccgcaggacc | 28380 |
| gcggtggtga | cgtggagggg | ctgtacgacc | ccgaccgcga | cgcgtccggc | aggacgtact | 28440 |
| gccgggtccg | cggattcctg | cacgacgcgc | gcgagttcga | cgcgcgactt | ttcgggatct | 28500 |
| cgccgcgcga | ggcctcgcgc | atggaccgcg | agcagcgact | gtccctcacc | accgcgtggg | 28560 |
| aggcgatcga | gagcgcgggc | atcgaccgga | cggccctgaa | gggcagcggc | ctcggcgtct | 28620 |
| tcgtcggcgg | ctggcacacc | ggctacacct | cggggcagac | caccgcctgt | cagtcgcccc | 28680 |
| agctggaggg | ccacctgggt | agcggcgccg | cgctgggctt | cctgtccggc | cgtatcgctg | 28740 |
| acgtcctcgg | tacggacgga | ccggccctga | ccgtggacac | ggcctgctcg | tcctcgctgg | 28800 |
| tcgctctgca | cctcgccgtg | caggccctcc | gcaaggcgga | gtgcgacatg | gcctcgccgc | 28860 |
| gtggtgtcac | ggtcatgccc | aacgcggacc | tgctcgtgca | gttcagccgg | cagcgcgggc | 28920 |
| tggccgcgga | cggccggctg | aaggcgcttc | ccacctcggc | ggacggcttc | ggccccgcgg | 28980 |
| agggcgccgg | agtctgctg | gtggagcgcc | tgctcgacgc | ccgccgcaac | ggacaccgga | 29040 |
| tcctcgccgg | cgctcgccgg | agcgcggctc | accaggacgg | cgccagcaac | ggcctcacgg | 29100 |
| ctccgcacgg | gccctcccag | cagcgcgtca | tcgcaggggc | cctggcgga | ggccggctcg | 29160 |
| cgcggggtga | cgtggacgtc | gtcgaggcgc | acggcacggg | cacgcggctc | ggcgaccgga | 29220 |
| tcgagggcga | ggcctcatc | gccacctacg | gccaggagaa | gagcagcgaa | cagccgctga | 29280 |
| ggctgggcgc | gttgaagtgc | aacatcgggc | acacgcaggc | cgcggccggg | gtcgcagggt | 29340 |
| tcacaaagat | ggtccaggcg | atgcgccacg | gactgtgccc | gaagacgctg | cacgtcgacg | 29400 |
| agccctcgga | ccagatcgac | tggtcggcgg | gcacggtgga | actcctcacc | gaggccgtcg | 29460 |
| actggccgga | gaagcaggac | ggcgggctgc | gccgcgcggc | tgtctcctcc | ttcggcatca | 29520 |
| gcgggacgaa | cgcgcacgtc | gtcctggagg | aggccccggc | ggtcgaggac | tcctcgccgc | 29580 |
| tcgagccgcc | ggccgggtgg | ggtgtggtgc | cgtggccggg | gtccgcgaag | actccggccg | 29640 |
| cgtggacgc | ccagatcggg | cagctcgccg | cgtacgcgga | cggctcgtacg | gacgtggatc | 29700 |
| cggcggtggc | cgcccgcgcc | ctggtcgaca | gccgtacggc | gatggagcac | cgcgcggctc | 29760 |
| cggtcggcga | cagccgggag | gcactgcggg | acgccctgcg | gatgccggaa | ggactggtac | 29820 |
| gcggcacgtc | ctcgacgtg | ggccgggtgg | cgcttcgtct | ccccggccag | ggcacgcagt | 29880 |
| gggcggcat | gggcggcgaa | ctccttgaca | gttcaccgga | gttcgctgcc | tcgatggccg | 29940 |
| aatgcgagac | cgcgtctctc | cgctacgtcg | actggtctct | tgaagccgtc | gtccgacagg | 30000 |
| aaccgggcgc | accacgtctc | gaccgcgtcg | acgtcgtcca | gcccgtgacc | ttcgtgttca | 30060 |
| tggtctcgct | ggcgaaggct | tggcagcacc | acggcatcac | ccccaggcc | gtcgtcgccc | 30120 |
| actcgcaggg | cgagatcgcc | gccgcgtacg | tcgccggtgc | actcaccctc | gacgacgcgc | 30180 |
| cccgctcgt | caccctgcgc | agcaagtcca | tcgccgccca | cctcgccggc | aagggcgcca | 30240 |
| tgatctccct | cgcctcgcac | gaggcgggcg | tcctgaagcg | actgagcgac | ttcgacggac | 30300 |

| | | | | | | |
|-------------|-------------|-------------|------------|-------------|-------------|-------|
| tctccgtcgc | cgccgtcaac | ggccccaccg | ccaccgtcgt | ctccggcgac | ccgaccacaga | 30360 |
| tcgaggaact | cgccccgacc | tgcgaggccg | acggcgctcg | tgcgcggatc | atccccggtcg | 30420 |
| actacgcctc | ccacagccgg | caggtcgaga | tcacgcagaa | ggagctggcc | gaggtcctcg | 30480 |
| ccggactcgc | cccgcaggct | ccgcacgtgc | cgttcttctc | cacctctgaa | ggcacctgga | 30540 |
| tcaccgagcc | gggtctcgac | ggcacctact | ggtaccgcaa | cctgcgccat | cgcgtaggct | 30600 |
| tcgccccgcg | cgtggagacc | ttggcggttg | acggcttcac | ccacttcac | gaggtcagcg | 30660 |
| ccccccccgt | cctcaccatg | accctccccg | agaccgtcac | cggcctcggc | accctccgcc | 30720 |
| gcgaacaggg | aggccaggag | cgtctgggtc | cctcactcgc | cgaagcctgg | gccaacggcc | 30780 |
| tcaccatcga | ctgggcgccc | atcctcccca | ccgcaaccgg | ccaccacccc | gagctcccca | 30840 |
| cctacgcctt | ccagaccgag | cgcttctggc | tgcagagctc | cgcgccccc | agcgccgccc | 30900 |
| acgactggcg | ttaccgcgtc | gagtggaaag | cgctgacggc | ctccggccag | gcggacctgt | 30960 |
| ccggggcggtg | gatcgctgcc | gtcgggagcg | agccagaagc | cgagctgctg | ggcgcgctga | 31020 |
| aggccgcggg | agcggaggtc | gacgtactgg | aagccggggc | ggacgacgac | cgtgaggccc | 31080 |
| tcgcccgcgg | gctcaccgca | ctgacgaccg | gcgacggctt | caccggcggtg | gtctcgctcc | 31140 |
| tcgacgacct | cgtgccacag | gtcgccctgg | tgcaggcact | cggcgacgcc | ggaatcaagg | 31200 |
| cgccccctgtg | gtccgtcacc | cagggcgccg | tctccgtcgg | acgtctcgac | acccccgccg | 31260 |
| acccccgaccg | ggccatgctc | tggggcctcg | gccgcgtcgt | cgcccttgag | caccccgaa | 31320 |
| gctggggccgg | cctcgctcgac | ctccccgccc | agcccgatgc | cgccgcccctc | gcccacctcg | 31380 |
| tcaccgcact | ctccggcgcc | accggcgagg | accagatcgc | catccgcacc | accggactcc | 31440 |
| acgcccgcgc | cctcgcccgc | gcacccctcc | acggacgtcg | gcccacccgc | gactggcagc | 31500 |
| cccacggcac | cgtcctcacc | accggcgcca | ccggagccct | cggcagccac | gccgcacgct | 31560 |
| ggatggccca | ccacgagacc | gaacacctcc | tctctgctag | ccgcagcgcc | gaacaagccc | 31620 |
| ccggagccac | ccaactcacc | gccgaactca | ccgcctcggg | cgcccgcgctc | accatcgccc | 31680 |
| cctgcgacgt | cgccgacccc | cacgccatgc | gcacccctct | cgacgccatc | cccgcgaga | 31740 |
| cgccccctcac | cgccgtcgctc | cacaccgccc | gcgcaccggg | cggcgatccg | ctggacgtca | 31800 |
| ccggccccgga | ggacatcgcc | cgcctcctgg | gcgcgaagac | gagcgccgcc | gaggtcctcg | 31860 |
| acgacctgct | ccgcggcact | ccgctggacg | ccttcgtcct | ctactcctcg | aacgccgggg | 31920 |
| tctggggcag | cggcagccag | ggcgtctacg | cggcggccaa | cgcccacctc | gacgcgctcg | 31980 |
| ccgcccggcg | ccgcgcccgg | ggcgagacgg | cgacctcggt | cgccctggggc | ctctggggccg | 32040 |
| gcgacggcat | gggcggggc | gcccagcagc | cgactggcca | gcgtcgcgcc | atccgtccga | 32100 |
| tgagccccga | ccgcgcccgtg | gacgaactgg | ccaaggccct | gagccacgac | gagacctctg | 32160 |
| tcgccgtggc | cgatgtcgac | tgggagcggg | tcgcgcccgc | gttcacgggtg | tcccgctcca | 32220 |
| gccttctgct | cgacggcgctc | ccggaggccc | ggcaggcgct | cgccgcaccc | gtcggtgccc | 32280 |
| cggctcccgg | cgacgcccgc | gtggcgccga | ccgggcagtc | gtcggcgctg | gccgcgatca | 32340 |
| ccgcgctccc | cgagcccag | cgccggccgg | cgctcctcac | cctcgctccgt | accacgcgg | 32400 |
| cggccgtact | cggccattcc | tcccccgacc | gggtggcccc | cgcccggtgcc | ttcaccgagc | 32460 |
| tcggcttcga | ctcgctgacg | gccgtgcagc | tccgcaacca | gctctccacg | gtggctcgga | 32520 |
| acaggtctcc | cgccaccacg | gtcttcgacc | acccgacgcc | cgccgcactc | gccgcgcacc | 32580 |
| tccacgaggg | gtacctcgca | ccggccgagc | cgcccccga | ggactgggag | ggcggggtgc | 32640 |
| gccggggccct | ggccgaactg | ccccctcgacc | ggctgcggga | cgcggggggtc | ctcgacaccg | 32700 |
| tcttgccct | caccggcatc | gagcccgagc | cggttccggg | cggttcggac | ggcgccgccc | 32760 |
| ccgaccctgg | tgcggagccg | gaggcgctga | tcgacgacct | ggacgccgag | gccctgatcc | 32820 |
| ggatgggtct | cggcccccg | aacacctgac | ccgaccgcgg | tcctgcccc | cgcgccgcac | 32880 |
| cccgcgcac | ccgcgcacca | ccgcccccca | cacgcccaca | accccatcca | cgagcggaag | 32940 |
| accacaccca | gatgacgagt | tccaacgaac | agttggtgga | cgctctgcgc | gcctctctca | 33000 |
| aggagaacga | agaactccgg | aaagagagcc | gtcgccgggc | cgaccgtcgg | caggagccca | 33060 |
| tggcgatcgt | cggcatgagc | tgcgggttcg | cgggcggaat | ccggctcccc | gaggacctct | 33120 |
| gggacgccgt | cgccgcgggc | aaggacctgg | tctccgaggt | accggaggag | cgcggtggg | 33180 |
| acatcgactc | cctctacgac | ccggtgcccc | ggcgcaaggg | cacgacgtac | gtccgcaacg | 33240 |
| ccgcgttcct | cgacgacgcc | gccggattcg | acgcggcctt | cttcgggatc | tcgcgcgcgcg | 33300 |
| aggccctcgc | catggaccgg | cagcagcgcc | agctcctcga | agcctcctgg | gaggtcttcg | 33360 |
| agcggggccg | catcgacccc | gcgtcggtcc | gcggcaccga | cgtcggcgtg | tacgtgggct | 33420 |
| gtggctacca | ggactacgcy | ccggacatcc | gggtcgcccc | cgaaggcacc | ggcggttacg | 33480 |
| tcgtcaccgg | caactcctcc | gccgtggcct | ccgggcgcac | cgcgactcct | ctcggccttg | 33540 |
| agggaccgcg | cgtgaccgtg | gacacggcgt | gctcctcttc | gctcgtcgcc | ctgcacctcg | 33600 |
| ccctgaaggg | ggcgactgct | ggcgactgct | cgacggcact | cgtgggcggc | gtggccgctc | 33660 |
| tcgcgacgcc | gggcgcggtt | atcgagttca | gcagccagca | ggccatggcc | gccgacggcc | 33720 |
| ggaccaaggg | cttcgcctcg | gcggcgagcg | gcctcgcttg | gggcgagggc | gtcgccgtac | 33780 |
| tcctcctcga | acggctctcc | gacgcgcggc | gcaaggccca | ccgggtcctg | gccgtcgtgc | 33840 |
| gcggcagcgc | catcaaccag | gacggcgcg | gcaacggcct | cacggctccg | cacgggcccct | 33900 |
| cccagcagca | cctgatccgc | cagggcctgg | ccgacgcgcg | gctcacgtcg | agcgacgtgg | 33960 |
| acgtcgtgga | gggccacggc | acggggaccc | gtctcggcga | cccgatcgag | gcgcaggcgc | 34020 |

| | | | | | | |
|-------------|-------------|-------------|-------------|-------------|-------------|-------|
| tgctcgccac | gtacgggag | gggagcgccc | cggggagcc | gctgaggctg | gggagctga | 34080 |
| agtcgaacat | cgggcacacg | caggccgctt | cggtgtctgc | cggtgtctgc | aagatggtgc | 34140 |
| aggcgctgcg | ccacgggggtg | ctgccgaaga | ccctgcacgt | ggacgagccg | acggaccagg | 34200 |
| tcgactgggtc | ggccgggttcg | gtcgagctgc | tcaccgaggg | cgtggactgg | ccggagcgccg | 34260 |
| cgggcccggct | ccgcccggcg | ggcgctctccg | cgttcggcgt | gggcccggacg | aacgcgcacg | 34320 |
| tcgtcctgga | ggaggccccg | gcggtcgagg | agtcctctgc | cgtcgagccg | ccggccggtg | 34380 |
| gcgccgtgggt | gcccgtggccg | gtgtccgcga | agacctcggc | cgcactggac | gcccagatcg | 34440 |
| ggcagctcgc | cgcatacgcg | gaagaccgca | cggacgtgga | tccggcggtg | gcccggcgcg | 34500 |
| ccctgggtcga | cagccgtacg | gcgatggagc | accgcgcggt | cgcggtcggc | gacagccggg | 34560 |
| aggcactgcg | ggacgcccctg | cggatgccgg | aaggactggt | acggggcagc | gtcaccgatc | 34620 |
| cgggcccgggt | ggcggttcgtc | ttccccggcc | agggcacgca | gtggggcggc | atggggcgccg | 34680 |
| aactcctcga | cagctcacc | gaattcgccg | ccgccatggc | cgaatgcgag | accgcactct | 34740 |
| ccccgtacga | cgactggctc | ctcgaagccg | tcgtccgaca | ggctcccagc | gcaccgacac | 34800 |
| tcgaccgcgt | cgacgtcgctc | cagcccgcca | ccttcgccc | catggtctcc | ctcgccaagg | 34860 |
| tctggcagca | ccacggcatc | acccccgagg | ccgtcatcgg | ccactcccag | ggcgagatcg | 34920 |
| ccgcccgcgta | cgtcgccgggt | gcccctcacc | tcgacgacgc | cgtcgtgtgc | gtgaccctcc | 34980 |
| gcagcaagtc | catcgccgcc | cacctcgccg | gcaagggcgg | catgatctcc | ctcgccctca | 35040 |
| gcgaggaagc | caccggcgag | cgcatacgaga | acctccacgg | actgtcgatc | gcccgcgtca | 35100 |
| acgggcctac | cgcacccgtg | gtttcgggcg | acccccacca | gatccaagaa | cttgctcagg | 35160 |
| cgtgtgaggg | cgacggcatc | cgcgcacgga | tcattcccgt | cgactacgcc | ttccacagcg | 35220 |
| cccacgtcga | gaccactcgag | aacgaactcg | ccgacgtcct | ggcggggttg | ttcccccaga | 35280 |
| cacccaggtg | cccccttctc | tcacccctcg | aaggcacctg | gatcacgaa | cccgcctcgc | 35340 |
| acggcggtcta | ctgggtaccgc | aacctccgcg | atcgtgtggg | cttcgccccg | gccgtcgaga | 35400 |
| ccctcgccac | cgacgaaggc | ttcaccact | tcatacgagg | cagcgccac | ccgctcctca | 35460 |
| ccatgaccct | ccccgacaag | gtcaccggcc | tggccacct | ccgacgcgag | gacggcgagc | 35520 |
| agcaccgcct | caccacctcc | cttgccgagg | cctgggcca | cggcctcgcc | ctcgactggg | 35580 |
| cctccctcct | gcccgcacag | ggcgccctca | gccccgcggt | ccccgacctc | ccgacgtacg | 35640 |
| ccttcagca | ccgctcgtac | tggatcagcc | ccgcgggtcc | cggcgaggcg | cccgcgcaca | 35700 |
| ccgcttcggg | gcgcgaggcc | gtcgccgaga | cggggtctgc | gtggggcccg | ggtgccgagg | 35760 |
| acctgcagc | ggagggccgg | cgcagcgccg | tactcgcgat | ggtgatgcgg | caggcgccct | 35820 |
| ccgtgtcccg | gtgcgactcg | cccgaagagg | tcctccgaga | ccgcccgcgtg | cgggagatcg | 35880 |
| gcttcgactc | gctgaccgcc | gtcgacttcc | gcaaccgcgt | caaccggctg | accggtctcc | 35940 |
| agctgccgcc | caccgtcgtg | ttccagcacc | cgacgcccgt | cgcgctcgcc | gagcgcatca | 36000 |
| gcgacgagct | ggccgagcgg | aactgggccc | tcgcccagcc | gtcggatcac | gagcaggcgg | 36060 |
| aggaggagaa | ggccgcccgt | ccggcggggg | cccgtccggg | ggccgacacc | ggcgccggcg | 36120 |
| ccgggatgtt | ccgcgccctg | ttccggcgag | ccgtggagga | cgaccgggtac | ggcgagttcc | 36180 |
| tcgacgtcct | cgcgaagcc | tcgcggttcc | gcccgcagtt | cgcctcgccc | gaggcctgct | 36240 |
| cggagcggct | cgaccgggtg | ctgctcgccg | gcggtccgac | ggaccggggc | gaaggccgtg | 36300 |
| ccgttctcgt | cggctgcacc | ggcaccgcgg | cgaaccgcgg | cccgcacgag | ttcctgcggc | 36360 |
| tcagcacctc | cttcaggag | gagcgggact | tcctcgccgt | acctctcccc | ggctacggca | 36420 |
| cgggtacggg | caccggcacg | gcccctcctc | cggccgatct | cgacaccgcg | ctcgacgccc | 36480 |
| aggcccgggc | gacccctcgg | gcccgcgggg | acgcccgggt | cgtcctgctc | gggactccg | 36540 |
| gcggcgccct | gctcgcgac | gagctggcct | tcgcctgga | gcgggcgcac | ggcgcgccgc | 36600 |
| cggccgggat | cgtcctgggtc | gacccctatc | cgccggggcca | tcaggagccc | atcgaggtgt | 36660 |
| ggagcaggca | gctggggcag | ggcctgttcg | cgggcgagct | ggagccgatg | tcgatgccc | 36720 |
| ggctgctggc | catggggccg | tacgcgcgggt | tcctcgccgg | cccgcggccg | ggccgcagca | 36780 |
| gcgcgcccgt | gcttctgggtc | cgtgcctccg | aaccgctggg | cgactggcag | gaggagccgg | 36840 |
| gcgactggcg | tgcccactgg | gaccttcgcg | acaccgtcgc | ggacgtgccg | ggcgaccact | 36900 |
| tcacgatgat | gcgggaccac | gcgcggcccg | tcgcccaggc | cgtcctctcc | tggctcgacg | 36960 |
| ccatcgaggg | catcgagggg | gcgggcaagt | gaccgacaga | cctctgaacg | tggacagcgg | 37020 |
| actgtggatc | cggcgcttcc | acccgcgcgc | gaacagcgcg | gtgcggctgg | tctgctgcc | 37080 |
| gcacgcgcgc | ggctccgcca | gctacttctt | ccgcttctcg | gaggagctgc | acccctccgt | 37140 |
| cgaggccctg | tcggtgcagt | atccggggccg | ccaggaccgg | cgtgccgagc | cgtgtctgga | 37200 |
| gagcgtcgag | gagctcgccg | agcatgtgggt | cgcggccacc | gaaccctggt | ggcaggaggg | 37260 |
| ccggctggcc | ttcttcgggc | acagcctcgg | cgctccgctc | gccttcgaga | cggcccgcac | 37320 |
| cctggaacag | cggcagggg | tacggcccga | ggcctgttac | gtctccgggtc | ggcgcgcccc | 37380 |
| gtcgctggcg | ccggaccggc | tcgtccacca | gctggagcac | cgggcgttcc | tggccgagat | 37440 |
| ccggcggtc | agcggcaccg | acgagcgggt | cctccaggac | gacgagctgc | tgcggctgggt | 37500 |
| gctgcccgcg | ctgcgcagcg | actacaaggc | ggcggagacg | tacctgcacc | ggccgtccgc | 37560 |
| caagctcacc | tgcccgggtga | tggccctggc | cggcgaccgt | gacccgaagg | cgccgctgaa | 37620 |
| cgaggtggcc | gagtggcgctc | ggcacaccag | cgggcccgttc | tgcctccggg | cgtactccgg | 37680 |
| cggccacttc | tacctcaacg | accagtggca | cgagatctgc | aacgacatct | ccgaccacct | 37740 |

```

gctcgtcacc cgcggcgcgc ccgatgcccg cgtcgtgcag ccccgacca gccttatcga 37800
aggagcggcg aagagatggc agaaccacg gtgaccgacg acctgacggg ggccctcacg 37860
cagccccgcg tgggcgcgac cgtccgcgcg gtggccgacc gtgaactcgg caccacctc 37920
ctggagaccc gcggcatcca ctggatcc 37948

```

```

<210> 6
<211> 12199
<212> PRT
<213> Streptomyces venezuelae

```

```

<400> 6
Met Ala Phe Ser Pro Gln Gly Gly Arg His Glu Leu Gly Gln Asn Phe
 1      5      10      15
Leu Val Asp Arg Ser Val Ile Asp Glu Ile Asp Gly Leu Val Ala Arg
 20      25      30
Thr Lys Gly Pro Ile Leu Glu Ile Gly Pro Gly Asp Gly Ala Leu Thr
 35      40      45
Leu Pro Leu Ser Arg His Gly Arg Pro Ile Thr Ala Val Glu Leu Asp
 50      55      60
Gly Arg Arg Ala Gln Arg Leu Gly Ala Arg Thr Pro Gly His Val Thr
 65      70      75      80
Val Val His His Asp Phe Leu Gln Tyr Pro Leu Pro Arg Asn Pro His
 85      90      95
Val Val Val Gly Asn Val Pro Phe His Leu Thr Thr Ala Ile Met Arg
100      105      110
Arg Leu Leu Asp Ala Gln His Trp His Thr Ala Val Leu Leu Val Gln
115      120      125
Trp Glu Val Ala Arg Arg Arg Ala Gly Val Gly Gly Ser Thr Leu Leu
130      135      140
Thr Ala Gly Trp Ala Pro Trp Tyr Glu Phe Asp Leu His Ser Arg Val
145      150      155      160
Pro Ala Arg Ala Phe Arg Pro Met Pro Gly Val Asp Gly Gly Val Leu
165      170      175
Ala Ile Arg Arg Arg Ser Ala Pro Leu Val Gly Gln Val Lys Thr Tyr
180      185      190
Gln Asp Phe Val Arg Gln Val Phe Thr Gly Lys Gly Asn Gly Leu Lys
195      200      205
Glu Ile Leu Arg Arg Thr Gly Arg Ile Ser Gln Arg Asp Leu Ala Thr
210      215      220
Trp Leu Arg Arg Asn Glu Ile Ser Pro His Ala Leu Pro Lys Asp Leu
225      230      235      240
Lys Pro Gly Gln Trp Ala Ser Leu Trp Glu Leu Thr Gly Gly Thr Ala
245      250      255
Asp Gly Ser Phe Asp Gly Thr Ala Gly Gly Gly Ala Ala Gly Ser His
260      265      270
Gly Ala Ala Arg Val Gly Ala Gly His Pro Gly Gly Arg Val Ser Ala
275      280      285
Ser Arg Arg Gly Val Pro Gln Ala Arg Arg Gly Arg Gly His Ala Val
290      295      300
Arg Ser Ser Thr Gly Thr Glu Pro Arg Trp Gly Arg Gly Arg Ala Glu
305      310      315      320
Ser Ala Met Ala Met Arg Asp Ser Ile Pro Arg Arg Ala Asp Arg Asp
325      330      335
Thr Leu Arg Arg Glu Leu Gly Gln Asn Phe Leu Gln Asp Asp Arg Ala
340      345      350
Val Arg Asn Leu Val Thr His Val Glu Gly Asp Gly Arg Asn Val Leu
355      360      365
Glu Ile Gly Pro Gly Lys Gly Ala Ile Thr Glu Glu Leu Val Arg Ser
370      375      380

```

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Phe | Asp | Thr | Val | Thr | Val | Val | Glu | Met | Asp | Pro | His | Trp | Ala | Ala | His |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Val | Arg | Arg | Lys | Phe | Glu | Gly | Glu | Arg | Val | Thr | Val | Phe | Gln | Gly | Asp |
| | | | | 405 | | | | | 410 | | | | | 415 | |
| Phe | Leu | Asp | Phe | Arg | Ile | Pro | Arg | Asp | Ile | Asp | Thr | Val | Val | Gly | Asn |
| | | | 420 | | | | | 425 | | | | | 430 | | |
| Val | Pro | Phe | Gly | Ile | Thr | Thr | Gln | Ile | Leu | Arg | Ser | Leu | Leu | Glu | Ser |
| | | 435 | | | | | 440 | | | | | 445 | | | |
| Thr | Asn | Trp | Gln | Ser | Ala | Ala | Leu | Ile | Val | Gln | Trp | Glu | Val | Ala | Arg |
| | 450 | | | | | 455 | | | | | 460 | | | | |
| Lys | Arg | Ala | Gly | Arg | Ser | Gly | Gly | Ser | Leu | Leu | Thr | Thr | Ser | Trp | Ala |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 |
| Pro | Trp | Tyr | Glu | Phe | Ala | Val | His | Asp | Arg | Val | Arg | Ala | Ser | Ser | Phe |
| | | | | 485 | | | | | 490 | | | | | 495 | |
| Arg | Pro | Met | Pro | Arg | Val | Asp | Gly | Gly | Val | Leu | Thr | Ile | Arg | Arg | Arg |
| | | | 500 | | | | | 505 | | | | | 510 | | |
| Pro | Gln | Pro | Leu | Leu | Pro | Glu | Ser | Ala | Ser | Arg | Ala | Phe | Gln | Asn | Phe |
| | | 515 | | | | | 520 | | | | | 525 | | | |
| Ala | Glu | Ala | Val | Phe | Thr | Gly | Pro | Gly | Arg | Gly | Leu | Ala | Glu | Ile | Leu |
| | 530 | | | | | 535 | | | | | 540 | | | | |
| Arg | Arg | His | Ile | Pro | Lys | Arg | Thr | Tyr | Arg | Ser | Leu | Ala | Asp | Arg | His |
| 545 | | | | | 550 | | | | | 555 | | | | | 560 |
| Gly | Ile | Pro | Asp | Gly | Gly | Leu | Pro | Lys | Asp | Leu | Thr | Leu | Thr | Gln | Trp |
| | | | | 565 | | | | | 570 | | | | | 575 | |
| Ile | Ala | Leu | Phe | Gln | Ala | Ser | Gln | Pro | Ser | Tyr | Ala | Pro | Gly | Ala | Pro |
| | | | 580 | | | | | 585 | | | | | 590 | | |
| Gly | Thr | Arg | Met | Pro | Gly | Gln | Gly | Gly | Gly | Ala | Gly | Gly | Arg | Asp | Tyr |
| | | 595 | | | | 600 | | | | | | 605 | | | |
| Asp | Ser | Glu | Thr | Ser | Arg | Ala | Ala | Val | Pro | Gly | Ser | Arg | Arg | Tyr | Gly |
| | 610 | | | | | 615 | | | | | 620 | | | | |
| Pro | Thr | Arg | Gly | Gly | Glu | Pro | Cys | Ala | Pro | Arg | Ala | Gln | Val | Arg | Gln |
| 625 | | | | | 630 | | | | | 635 | | | | | 640 |
| Thr | Lys | Gly | Arg | Gln | Gly | Ala | Arg | Gly | Ser | Ser | Tyr | Gly | Arg | Arg | Thr |
| | | | | 645 | | | | | 650 | | | | | 655 | |
| Gly | Arg | Met | Ser | Ser | Ala | Gly | Ile | Thr | Arg | Thr | Gly | Ala | Arg | Thr | Pro |
| | | | 660 | | | | | 665 | | | | | 670 | | |
| Val | Thr | Gly | Arg | Gly | Ala | Ala | Ala | Trp | Asp | Thr | Gly | Glu | Val | Arg | Val |
| | | 675 | | | | | 680 | | | | | 685 | | | |
| Arg | Arg | Gly | Leu | Pro | Pro | Ala | Gly | Pro | Asp | His | Ala | Glu | His | Ser | Phe |
| | 690 | | | | | 695 | | | | | 700 | | | | |
| Ser | Arg | Ala | Pro | Thr | Gly | Asp | Val | Arg | Ala | Glu | Leu | Ile | Arg | Gly | Glu |
| 705 | | | | | 710 | | | | | 715 | | | | | 720 |
| Met | Ser | Thr | Val | Ser | Lys | Ser | Glu | Ser | Glu | Glu | Phe | Val | Ser | Val | Ser |
| | | | | 725 | | | | | 730 | | | | | 735 | |
| Asn | Asp | Ala | Gly | Ser | Ala | His | Gly | Thr | Ala | Glu | Pro | Val | Ala | Val | Val |
| | | | 740 | | | | | 745 | | | | | 750 | | |
| Gly | Ile | Ser | Cys | Arg | Val | Pro | Gly | Ala | Arg | Asp | Pro | Arg | Glu | Phe | Trp |
| | | 755 | | | | | 760 | | | | | 765 | | | |
| Glu | Leu | Leu | Ala | Ala | Gly | Gly | Gln | Ala | Val | Thr | Asp | Val | Pro | Ala | Asp |
| | 770 | | | | | 775 | | | | | 780 | | | | |
| Arg | Trp | Asn | Ala | Gly | Asp | Phe | Tyr | Asp | Pro | Asp | Arg | Ser | Ala | Pro | Gly |
| 785 | | | | | 790 | | | | | 795 | | | | | 800 |
| Arg | Ser | Asn | Ser | Arg | Trp | Gly | Gly | Phe | Ile | Glu | Asp | Val | Asp | Arg | Phe |
| | | | | 805 | | | | | 810 | | | | | 815 | |
| Asp | Ala | Ala | Phe | Gly | Ile | Ser | Pro | Arg | Glu | Ala | Ala | Glu | Met | Asp | |
| | | | 820 | | | | 825 | | | | | 830 | | | |
| Pro | Gln | Gln | Arg | Leu | Ala | Leu | Glu | Leu | Gly | Trp | Glu | Ala | Leu | Glu | Arg |
| | | 835 | | | | | 840 | | | | | 845 | | | |
| Ala | Gly | Ile | Asp | Pro | Ser | Ser | Leu | Thr | Gly | Thr | Arg | Thr | Gly | Val | Phe |
| | 850 | | | | | 855 | | | | | 860 | | | | |
| Ala | Gly | Ala | Ile | Trp | Asp | Asp | Tyr | Ala | Thr | Leu | Lys | His | Arg | Gln | Gly |
| 865 | | | | | 870 | | | | | 875 | | | | | 880 |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Gly | Ala | Ala | Ile | Thr | Pro | His | Thr | Val | Thr | Gly | Leu | His | Arg | Gly | Ile | 885 | 890 | 895 |
| Ile | Ala | Asn | Arg | Leu | Ser | Tyr | Thr | Leu | Gly | Leu | Arg | Gly | Pro | Ser | Met | 900 | 905 | 910 |
| Val | Val | Asp | Ser | Gly | Gln | Ser | Ser | Ser | Leu | Val | Ala | Val | His | Leu | Ala | 915 | 920 | 925 |
| Cys | Glu | Ser | Leu | Arg | Arg | Gly | Glu | Ser | Glu | Leu | Ala | Leu | Ala | Gly | Gly | 930 | 935 | 940 |
| Val | Ser | Leu | Asn | Leu | Val | Pro | Asp | Ser | Ile | Ile | Gly | Ala | Ser | Lys | Phe | 945 | 950 | 955 |
| Gly | Gly | Leu | Ser | Pro | Asp | Gly | Arg | Ala | Tyr | Thr | Phe | Asp | Ala | Arg | Ala | 965 | 970 | 975 |
| Asn | Gly | Tyr | Val | Arg | Gly | Glu | Gly | Gly | Phe | Val | Val | Leu | Lys | Arg | | 980 | 985 | 990 |
| Leu | Ser | Arg | Ala | Val | Ala | Asp | Gly | Asp | Pro | Val | Leu | Ala | Val | Ile | Arg | 995 | 1000 | 1005 |
| Gly | Ser | Ala | Val | Asn | Asn | Gly | Gly | Ala | Ala | Gln | Gly | Met | Thr | Thr | Pro | 1010 | 1015 | 1020 |
| Asp | Ala | Gln | Ala | Gln | Glu | Ala | Val | Leu | Arg | Glu | Ala | His | Glu | Arg | Ala | 1025 | 1030 | 1035 |
| Gly | Thr | Ala | Pro | Ala | Asp | Val | Arg | Tyr | Val | Glu | Leu | His | Gly | Thr | Gly | 1045 | 1050 | 1055 |
| Thr | Pro | Val | Gly | Asp | Pro | Ile | Glu | Ala | Ala | Ala | Leu | Gly | Ala | Ala | Leu | 1060 | 1065 | 1070 |
| Gly | Thr | Gly | Arg | Pro | Ala | Gly | Gln | Pro | Leu | Leu | Val | Gly | Ser | Val | Lys | 1075 | 1080 | 1085 |
| Thr | Asn | Ile | Gly | His | Leu | Glu | Gly | Ala | Ala | Gly | Ile | Ala | Gly | Leu | Ile | 1090 | 1095 | 1100 |
| Lys | Ala | Val | Leu | Ala | Val | Arg | Gly | Arg | Ala | Leu | Pro | Ala | Ser | Leu | Asn | 1105 | 1110 | 1115 |
| Tyr | Glu | Thr | Pro | Asn | Pro | Ala | Ile | Pro | Phe | Glu | Glu | Leu | Asn | Leu | Arg | 1125 | 1130 | 1135 |
| Val | Asn | Thr | Glu | Tyr | Leu | Pro | Trp | Glu | Pro | Glu | His | Asp | Gly | Gln | Arg | 1140 | 1145 | 1150 |
| Met | Val | Val | Gly | Val | Ser | Ser | Phe | Gly | Met | Gly | Gly | Thr | Asn | Ala | His | 1155 | 1160 | 1165 |
| Val | Val | Leu | Glu | Glu | Ala | Pro | Gly | Gly | Cys | Arg | Gly | Ala | Ser | Val | Val | 1170 | 1175 | 1180 |
| Glu | Ser | Thr | Val | Gly | Gly | Ser | Ala | Val | Gly | Gly | Gly | Val | Val | Pro | Trp | 1185 | 1190 | 1195 |
| Val | Val | Ser | Ala | Lys | Ser | Ala | Ala | Ala | Leu | Asp | Ala | Gln | Ile | Glu | Arg | 1205 | 1210 | 1215 |
| Leu | Ala | Ala | Phe | Ala | Ser | Arg | Asp | Arg | Thr | Asp | Gly | Val | Asp | Ala | Gly | 1220 | 1225 | 1230 |
| Ala | Val | Asp | Ala | Gly | Ala | Val | Asp | Ala | Gly | Ala | Val | Ala | Arg | Val | Leu | 1235 | 1240 | 1245 |
| Ala | Gly | Gly | Arg | Ala | Gln | Phe | Glu | His | Arg | Ala | Val | Val | Val | Gly | Ser | 1250 | 1255 | 1260 |
| Gly | Pro | Asp | Asp | Leu | Ala | Ala | Ala | Leu | Ala | Ala | Pro | Glu | Gly | Leu | Val | 1265 | 1270 | 1275 |
| Arg | Gly | Val | Ala | Ser | Gly | Val | Gly | Arg | Val | Ala | Phe | Val | Phe | Pro | Gly | 1285 | 1290 | 1295 |
| Gln | Gly | Thr | Gln | Trp | Ala | Gly | Met | Gly | Ala | Glu | Leu | Leu | Asp | Ser | Ser | 1300 | 1305 | 1310 |
| Ala | Val | Phe | Ala | Ala | Ala | Met | Ala | Glu | Cys | Glu | Ala | Ala | Leu | Ser | Pro | 1315 | 1320 | 1325 |
| Tyr | Val | Asp | Trp | Ser | Leu | Glu | Ala | Val | Val | Arg | Gln | Ala | Pro | Gly | Ala | 1330 | 1335 | 1340 |
| Pro | Thr | Leu | Glu | Arg | Val | Asp | Val | Val | Gln | Pro | Val | Thr | Phe | Ala | Val | 1345 | 1350 | 1355 |
| Met | Val | Ser | Leu | Ala | Arg | Val | Trp | Gln | His | His | Gly | Val | Thr | Pro | Gln | 1365 | 1370 | 1375 |

Ala Val Val Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala
 1380 1385 1390
 Gly Ala Leu Ser Leu Asp Asp Ala Ala Arg Val Val Thr Leu Arg Ser
 1395 1400 1405
 Lys Ser Ile Ala Ala His Leu Ala Gly Lys Gly Gly Met Leu Ser Leu
 1410 1415 1420
 Ala Leu Ser Glu Asp Ala Val Leu Glu Arg Leu Ala Gly Phe Asp Gly
 1425 1430 1435 1440
 Leu Ser Val Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly
 1445 1450 1455
 Asp Pro Val Gln Ile Glu Glu Leu Ala Arg Ala Cys Glu Ala Asp Gly
 1460 1465 1470
 Val Arg Ala Arg Val Ile Pro Val Asp Tyr Ala Ser His Ser Arg Gln
 1475 1480 1485
 Val Glu Ile Ile Glu Ser Glu Leu Ala Glu Val Leu Ala Gly Leu Ser
 1490 1495 1500
 Pro Gln Ala Pro Arg Val Pro Phe Phe Ser Thr Leu Glu Gly Ala Trp
 1505 1510 1515 1520
 Ile Thr Glu Pro Val Leu Asp Gly Gly Tyr Trp Tyr Arg Asn Leu Arg
 1525 1530 1535
 His Arg Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr Asp Glu
 1540 1545 1550
 Gly Phe Thr His Phe Val Glu Val Ser Ala His Pro Val Leu Thr Met
 1555 1560 1565
 Ala Leu Pro Gly Thr Val Thr Gly Leu Ala Thr Leu Arg Arg Asp Asn
 1570 1575 1580
 Gly Gly Gln Asp Arg Leu Val Ala Ser Leu Ala Glu Ala Trp Ala Asn
 1585 1590 1595 1600
 Gly Leu Ala Val Asp Trp Ser Pro Leu Leu Pro Ser Ala Thr Gly His
 1605 1610 1615
 His Ser Asp Leu Pro Thr Tyr Ala Phe Gln Thr Glu Arg His Trp Leu
 1620 1625 1630
 Gly Glu Ile Glu Ala Leu Ala Pro Ala Gly Glu Pro Ala Val Gln Pro
 1635 1640 1645
 Ala Val Leu Arg Thr Glu Ala Ala Glu Pro Ala Glu Leu Asp Arg Asp
 1650 1655 1660
 Glu Gln Leu Arg Val Ile Leu Asp Lys Val Arg Ala Gln Thr Ala Gln
 1665 1670 1675 1680
 Val Leu Gly Tyr Ala Thr Gly Gly Gln Ile Glu Val Asp Arg Thr Phe
 1685 1690 1695
 Arg Glu Ala Gly Cys Thr Ser Leu Thr Gly Val Asp Leu Arg Asn Arg
 1700 1705 1710
 Ile Asn Ala Ala Phe Gly Val Arg Met Ala Pro Ser Met Ile Phe Asp
 1715 1720 1725
 Phe Pro Thr Pro Glu Ala Leu Ala Glu Gln Leu Leu Leu Val Val His
 1730 1735 1740
 Gly Glu Ala Ala Ala Asn Pro Ala Gly Ala Glu Pro Ala Pro Val Ala
 1745 1750 1755 1760
 Ala Ala Gly Ala Val Asp Glu Pro Val Ala Ile Val Gly Met Ala Cys
 1765 1770 1775
 Arg Leu Pro Gly Gly Val Ala Ser Pro Glu Asp Leu Trp Arg Leu Val
 1780 1785 1790
 Ala Gly Gly Gly Asp Ala Ile Ser Glu Phe Pro Gln Asp Arg Gly Trp
 1795 1800 1805
 Asp Val Glu Gly Leu Tyr His Pro Asp Pro Glu His Pro Gly Thr Ser
 1810 1815 1820
 Tyr Val Arg Gln Gly Gly Phe Ile Glu Asn Val Ala Gly Phe Asp Ala
 1825 1830 1835 1840
 Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln
 1845 1850 1855
 Gln Arg Leu Leu Leu Glu Thr Ser Trp Glu Ala Val Glu Asp Ala Gly
 1860 1865 1870

| | | | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|
| Ile | Asp | Pro | Thr | Ser | Leu | Arg | Gly | Arg | Gln | Val | Gly | Val | Phe | Thr | Gly | | |
| | | 1875 | | | | | 1880 | | | | | 1885 | | | | | |
| Ala | Met | Thr | His | Glu | Tyr | Gly | Pro | Ser | Leu | Arg | Asp | Gly | Gly | Glu | Gly | | |
| | 1890 | | | | | 1895 | | | | | 1900 | | | | | | |
| Leu | Asp | Gly | Tyr | Leu | Leu | Thr | Gly | Asn | Thr | Ala | Ser | Val | Met | Ser | Gly | | |
| 1905 | | | | | 1910 | | | | | 1915 | | | | | 1920 | | |
| Arg | Val | Ser | Tyr | Thr | Leu | Gly | Leu | Glu | Gly | Pro | Ala | Leu | Thr | Val | Asp | | |
| | | | | 1925 | | | | | 1930 | | | | | 1935 | | | |
| Thr | Ala | Cys | Ser | Ser | Ser | Leu | Val | Ala | Leu | His | Leu | Ala | Val | Gln | Ala | | |
| | | 1940 | | | | | 1945 | | | | | | 1950 | | | | |
| Leu | Arg | Lys | Gly | Glu | Val | Asp | Met | Ala | Leu | Ala | Gly | Gly | Val | Ala | Val | | |
| | 1955 | | | | | | 1960 | | | | | 1965 | | | | | |
| Met | Pro | Thr | Pro | Gly | Met | Phe | Val | Glu | Phe | Ser | Arg | Gln | Arg | Gly | Leu | | |
| | 1970 | | | | | 1975 | | | | | 1980 | | | | | | |
| Ala | Gly | Asp | Gly | Arg | Ser | Lys | Ala | Phe | Ala | Ala | Ser | Ala | Asp | Gly | Thr | | |
| 1985 | | | | | 1990 | | | | | 1995 | | | | | 2000 | | |
| Ser | Trp | Ser | Glu | Gly | Val | Gly | Val | Leu | Leu | Val | Glu | Arg | Leu | Ser | Asp | | |
| | | | | 2005 | | | | | 2010 | | | | | 2015 | | | |
| Ala | Arg | Arg | Asn | Gly | His | Gln | Val | Leu | Ala | Val | Val | Arg | Gly | Ser | Ala | | |
| | | | 2020 | | | | 2025 | | | | | | 2030 | | | | |
| Leu | Asn | Gln | Asp | Gly | Ala | Ser | Asn | Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | | |
| | 2035 | | | | | | 2040 | | | | | 2045 | | | | | |
| Ser | Gln | Gln | Arg | Val | Ile | Arg | Arg | Ala | Leu | Ala | Asp | Ala | Arg | Leu | Thr | | |
| | 2050 | | | | | 2055 | | | | | 2060 | | | | | | |
| Thr | Ser | Asp | Val | Asp | Val | Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Arg | Leu | | |
| 2065 | | | | | 2070 | | | | | 2075 | | | | | 2080 | | |
| Gly | Asp | Pro | Ile | Glu | Ala | Gln | Ala | Leu | Ile | Ala | Thr | Tyr | Gly | Gln | Gly | | |
| | | | | 2085 | | | | | 2090 | | | | | 2095 | | | |
| Arg | Asp | Asp | Glu | Gln | Pro | Leu | Arg | Leu | Gly | Ser | Leu | Lys | Ser | Asn | Ile | | |
| | | | 2100 | | | | | 2105 | | | | | 2110 | | | | |
| Gly | His | Thr | Gln | Ala | Ala | Ala | Gly | Val | Ser | Gly | Val | Ile | Lys | Met | Val | | |
| | 2115 | | | | | | 2120 | | | | | 2125 | | | | | |
| Gln | Ala | Met | Arg | His | Gly | Leu | Leu | Pro | Lys | Thr | Leu | His | Val | Asp | Glu | | |
| | 2130 | | | | | 2135 | | | | | 2140 | | | | | | |
| Pro | Ser | Asp | Gln | Ile | Asp | Trp | Ser | Ala | Gly | Ala | Val | Glu | Leu | Leu | Thr | | |
| 2145 | | | | | 2150 | | | | | 2155 | | | | | 2160 | | |
| Glu | Ala | Val | Asp | Trp | Pro | Glu | Lys | Gln | Asp | Gly | Gly | Leu | Arg | Arg | Ala | | |
| | | | | 2165 | | | | | 2170 | | | | | 2175 | | | |
| Ala | Val | Ser | Ser | Phe | Gly | Ile | Ser | Gly | Thr | Asn | Ala | His | Val | Val | Leu | | |
| | | | 2180 | | | | | 2185 | | | | | 2190 | | | | |
| Glu | Glu | Ala | Pro | Val | Val | Val | Glu | Gly | Ala | Ser | Val | Val | Glu | Pro | Ser | | |
| | 2195 | | | | | | 2200 | | | | | 2205 | | | | | |
| Val | Gly | Gly | Ser | Ala | Val | Gly | Gly | Gly | Val | Thr | Pro | Trp | Val | Val | Ser | | |
| | 2210 | | | | | 2215 | | | | | 2220 | | | | | | |
| Ala | Lys | Ser | Ala | Ala | Ala | Leu | Asp | Ala | Gln | Ile | Glu | Arg | Leu | Ala | Ala | | |
| 2225 | | | | | 2230 | | | | | 2235 | | | | | 2240 | | |
| Phe | Ala | Ser | Arg | Asp | Arg | Thr | Asp | Asp | Ala | Asp | Ala | Gly | Ala | Val | Asp | | |
| | | | | 2245 | | | | 2250 | | | | | | 2255 | | | |
| Ala | Gly | Ala | Val | Ala | His | Val | Leu | Ala | Asp | Gly | Arg | Ala | Gln | Phe | Glu | | |
| | | | 2260 | | | | | 2265 | | | | | 2270 | | | | |
| His | Arg | Ala | Val | Ala | Leu | Gly | Ala | Gly | Ala | Asp | Asp | Leu | Val | Gln | Ala | | |
| | 2275 | | | | | | 2280 | | | | | 2285 | | | | | |
| Leu | Ala | Asp | Pro | Asp | Gly | Leu | Ile | Arg | Gly | Thr | Ala | Ser | Gly | Val | Gly | | |
| | 2290 | | | | 2295 | | | | | | 2300 | | | | | | |
| Arg | Val | Ala | Phe | Val | Phe | Pro | Gly | Gln | Gly | Thr | Gln | Trp | Ala | Gly | Met | | |
| 2305 | | | | | 2310 | | | | | 2315 | | | | | 2320 | | |
| Gly | Ala | Glu | Leu | Leu | Asp | Ser | Ser | Ala | Val | Phe | Ala | Ala | Ala | Met | Ala | | |
| | | | | 2325 | | | | | 2330 | | | | | 2335 | | | |
| Glu | Cys | Glu | Ala | Ala | Leu | Ser | Pro | Tyr | Val | Asp | Trp | Ser | Leu | Glu | Ala | | |
| | | | 2340 | | | | | 2345 | | | | | 2350 | | | | |
| Val | Val | Arg | Gln | Ala | Pro | Gly | Ala | Pro | Thr | Leu | Glu | Arg | Val | Asp | Val | | |
| | 2355 | | | | | | 2360 | | | | | | 2365 | | | | |

| | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|-----|------|------|------|------|------|------|
| Val | Gln | Pro | Val | Thr | Phe | Ala | Val | Met | Val | Ser | Leu | Ala | Arg | Val | Trp |
| 2370 | | | | | | 2375 | | | | | 2380 | | | | |
| Gln | His | His | Gly | Val | Thr | Pro | Gln | Ala | Val | Val | Gly | His | Ser | Gln | Gly |
| 2385 | | | | | 2390 | | | | | 2395 | | | | | 2400 |
| Glu | Ile | Ala | Ala | Ala | Tyr | Val | Ala | Gly | Ala | Leu | Pro | Leu | Asp | Asp | Ala |
| | | | 2405 | | | | | 2410 | | | | | 2415 | | |
| Ala | Arg | Val | Val | Thr | Leu | Arg | Ser | Lys | Ser | Ile | Ala | Ala | His | Leu | Ala |
| | | 2420 | | | | | 2425 | | | | 2430 | | | | |
| Gly | Lys | Gly | Gly | Met | Leu | Ser | Leu | Ala | Leu | Asn | Glu | Asp | Ala | Val | Leu |
| | 2435 | | | | | 2440 | | | | | 2445 | | | | |
| Glu | Arg | Leu | Ser | Asp | Phe | Asp | Gly | Leu | Ser | Val | Ala | Ala | Val | Asn | Gly |
| | 2450 | | | | 2455 | | | | | 2460 | | | | | |
| Pro | Thr | Ala | Thr | Val | Val | Ser | Gly | Asp | Pro | Val | Gln | Ile | Glu | Glu | Leu |
| 2465 | | | | 2470 | | | | | | 2475 | | | | | 2480 |
| Ala | Gln | Ala | Cys | Lys | Ala | Asp | Gly | Phe | Arg | Ala | Arg | Ile | Ile | Pro | Val |
| | | | 2485 | | | | | 2490 | | | | | | 2495 | |
| Asp | Tyr | Ala | Ser | His | Ser | Arg | Gln | Val | Glu | Ile | Ile | Glu | Ser | Glu | Leu |
| | | 2500 | | | | | | 2505 | | | | 2510 | | | |
| Ala | Gln | Val | Leu | Ala | Gly | Leu | Ser | Pro | Gln | Ala | Pro | Arg | Val | Pro | Phe |
| | 2515 | | | | | 2520 | | | | | 2525 | | | | |
| Phe | Ser | Thr | Leu | Glu | Gly | Thr | Trp | Ile | Thr | Glu | Pro | Val | Leu | Asp | Gly |
| | 2530 | | | | 2535 | | | | | 2540 | | | | | |
| Thr | Tyr | Trp | Tyr | Arg | Asn | Leu | Arg | His | Arg | Val | Gly | Phe | Ala | Pro | Ala |
| 2545 | | | | | 2550 | | | | | 2555 | | | | | 2560 |
| Ile | Glu | Thr | Leu | Ala | Val | Asp | Glu | Gly | Phe | Thr | His | Phe | Val | Glu | Val |
| | | | 2565 | | | | | 2570 | | | | | | 2575 | |
| Ser | Ala | His | Pro | Val | Leu | Thr | Met | Thr | Leu | Pro | Glu | Thr | Val | Thr | Gly |
| | | 2580 | | | | | | 2585 | | | | 2590 | | | |
| Leu | Gly | Thr | Leu | Arg | Arg | Glu | Gln | Gly | Gly | Gln | Glu | Arg | Leu | Val | Thr |
| | 2595 | | | | | 2600 | | | | | 2605 | | | | |
| Ser | Leu | Ala | Glu | Ala | Trp | Val | Asn | Gly | Leu | Pro | Val | Ala | Trp | Thr | Ser |
| | 2610 | | | | | 2615 | | | | 2620 | | | | | |
| Leu | Leu | Pro | Ala | Thr | Ala | Ser | Arg | Pro | Gly | Leu | Pro | Thr | Tyr | Ala | Phe |
| 2625 | | | | 2630 | | | | | | 2635 | | | | | 2640 |
| Gln | Ala | Glu | Arg | Tyr | Trp | Leu | Glu | Asn | Thr | Pro | Ala | Ala | Leu | Ala | Thr |
| | | | 2645 | | | | | 2650 | | | | | | 2655 | |
| Gly | Asp | Asp | Trp | Arg | Tyr | Arg | Ile | Asp | Trp | Lys | Arg | Leu | Pro | Ala | Ala |
| | 2660 | | | | | | | 2665 | | | | 2670 | | | |
| Glu | Gly | Ser | Glu | Arg | Thr | Gly | Leu | Ser | Gly | Arg | Trp | Leu | Ala | Val | Thr |
| | 2675 | | | | | 2680 | | | | | 2685 | | | | |
| Pro | Glu | Asp | His | Ser | Ala | Gln | Ala | Ala | Ala | Val | Leu | Thr | Ala | Leu | Val |
| | 2690 | | | | | 2695 | | | | | 2700 | | | | |
| Asp | Ala | Gly | Ala | Lys | Val | Glu | Val | Leu | Thr | Ala | Gly | Ala | Asp | Asp | Asp |
| 2705 | | | | 2710 | | | | | | 2715 | | | | | 2720 |
| Arg | Glu | Ala | Leu | Ala | Ala | Arg | Leu | Thr | Ala | Leu | Thr | Thr | Gly | Asp | Gly |
| | | | 2725 | | | | | 2730 | | | | | | 2735 | |
| Phe | Thr | Gly | Val | Val | Ser | Leu | Leu | Asp | Gly | Leu | Val | Pro | Gln | Val | Ala |
| | | 2740 | | | | | | 2745 | | | | | 2750 | | |
| Trp | Val | Gln | Ala | Leu | Gly | Asp | Ala | Gly | Ile | Lys | Ala | Pro | Leu | Trp | Ser |
| | 2755 | | | | | 2760 | | | | | | 2765 | | | |
| Val | Thr | Gln | Gly | Ala | Val | Ser | Val | Gly | Arg | Leu | Asp | Thr | Pro | Ala | Asp |
| | 2770 | | | | | 2775 | | | | | 2780 | | | | |
| Pro | Asp | Arg | Ala | Met | Leu | Trp | Gly | Leu | Gly | Arg | Val | Val | Ala | Leu | Glu |
| 2785 | | | | 2790 | | | | | | 2795 | | | | | 2800 |
| His | Pro | Glu | Arg | Trp | Ala | Gly | Leu | Val | Asp | Leu | Pro | Ala | Gln | Pro | Asp |
| | | | 2805 | | | | | 2810 | | | | | | 2815 | |
| Ala | Ala | Ala | Leu | Ala | His | Leu | Val | Thr | Ala | Leu | Ser | Gly | Ala | Thr | Gly |
| | | 2820 | | | | | | 2825 | | | | 2830 | | | |
| Glu | Asp | Gln | Ile | Ala | Ile | Arg | Thr | Thr | Gly | Leu | His | Ala | Arg | Arg | Leu |
| | 2835 | | | | | | 2840 | | | | | 2845 | | | |
| Ala | Arg | Ala | Pro | Leu | His | Gly | Arg | Arg | Pro | Thr | Arg | Asp | Trp | Gln | Pro |
| | 2850 | | | | | 2855 | | | | | 2860 | | | | |

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| His | Gly | Thr | Val | Leu | Ile | Thr | Gly | Gly | Thr | Gly | Ala | Leu | Gly | Ser | His | 2865 | 2870 | 2875 | 2880 |
| Ala | Ala | Arg | Trp | Met | Ala | His | His | Gly | Ala | Glu | His | Leu | Leu | Leu | Val | 2885 | 2890 | 2895 | |
| Ser | Arg | Ser | Gly | Glu | Gln | Ala | Pro | Gly | Ala | Thr | Gln | Leu | Thr | Ala | Glu | 2900 | 2905 | 2910 | |
| Leu | Thr | Ala | Ser | Gly | Ala | Arg | Val | Thr | Ile | Ala | Ala | Cys | Asp | Val | Ala | 2915 | 2920 | 2925 | |
| Asp | Pro | His | Ala | Met | Arg | Thr | Leu | Leu | Asp | Ala | Ile | Pro | Ala | Glu | Thr | 2930 | 2935 | 2940 | |
| Pro | Leu | Thr | Ala | Val | Val | His | Thr | Ala | Gly | Ala | Leu | Asp | Asp | Gly | Ile | 2945 | 2950 | 2955 | 2960 |
| Val | Asp | Thr | Leu | Thr | Ala | Glu | Gln | Val | Arg | Arg | Ala | His | Arg | Ala | Lys | 2965 | 2970 | 2975 | |
| Ala | Val | Gly | Ala | Ser | Val | Leu | Asp | Glu | Leu | Thr | Arg | Asp | Leu | Asp | Leu | 2980 | 2985 | 2990 | |
| Asp | Ala | Phe | Val | Leu | Phe | Ser | Ser | Val | Ser | Ser | Thr | Leu | Gly | Ile | Pro | 2995 | 3000 | 3005 | |
| Gly | Gln | Gly | Asn | Tyr | Ala | Pro | His | Asn | Ala | Tyr | Leu | Asp | Ala | Leu | Ala | 3010 | 3015 | 3020 | |
| Ala | Arg | Arg | Arg | Ala | Thr | Gly | Arg | Ser | Ala | Val | Ser | Val | Ala | Trp | Gly | 3025 | 3030 | 3035 | 3040 |
| Pro | Trp | Asp | Gly | Gly | Gly | Met | Ala | Ala | Gly | Asp | Gly | Val | Ala | Glu | Arg | 3045 | 3050 | 3055 | |
| Leu | Arg | Asn | His | Gly | Val | Pro | Gly | Met | Asp | Pro | Glu | Leu | Ala | Leu | Ala | 3060 | 3065 | 3070 | |
| Ala | Leu | Glu | Ser | Ala | Leu | Gly | Arg | Asp | Glu | Thr | Ala | Ile | Thr | Val | Ala | 3075 | 3080 | 3085 | |
| Asp | Ile | Asp | Trp | Asp | Arg | Phe | Tyr | Leu | Ala | Tyr | Ser | Ser | Gly | Arg | Pro | 3090 | 3095 | 3100 | |
| Gln | Pro | Leu | Val | Glu | Glu | Leu | Pro | Glu | Val | Arg | Arg | Ile | Ile | Asp | Ala | 3105 | 3110 | 3115 | 3120 |
| Arg | Asp | Ser | Ala | Thr | Ser | Gly | Gln | Gly | Gly | Ser | Ser | Ala | Gln | Gly | Ala | 3125 | 3130 | 3135 | |
| Asn | Pro | Leu | Ala | Glu | Arg | Leu | Ala | Ala | Ala | Ala | Pro | Gly | Glu | Arg | Thr | 3140 | 3145 | 3150 | |
| Glu | Ile | Leu | Leu | Gly | Leu | Val | Arg | Ala | Gln | Ala | Ala | Ala | Val | Leu | Arg | 3155 | 3160 | 3165 | |
| Met | Arg | Ser | Pro | Glu | Asp | Val | Ala | Ala | Asp | Arg | Ala | Phe | Lys | Asp | Ile | 3170 | 3175 | 3180 | |
| Gly | Phe | Asp | Ser | Leu | Ala | Gly | Val | Glu | Leu | Arg | Asn | Arg | Leu | Thr | Arg | 3185 | 3190 | 3195 | 3200 |
| Ala | Thr | Gly | Leu | Gln | Leu | Pro | Ala | Thr | Leu | Val | Phe | Asp | His | Pro | Thr | 3205 | 3210 | 3215 | |
| Pro | Leu | Ala | Leu | Val | Ser | Leu | Leu | Arg | Ser | Glu | Phe | Leu | Gly | Asp | Glu | 3220 | 3225 | 3230 | |
| Glu | Thr | Ala | Asp | Ala | Arg | Arg | Ser | Ala | Ala | Leu | Pro | Ala | Thr | Val | Gly | 3235 | 3240 | 3245 | |
| Ala | Gly | Ala | Gly | Ala | Gly | Ala | Gly | Thr | Asp | Ala | Asp | Asp | Asp | Pro | Ile | 3250 | 3255 | 3260 | |
| Ala | Ile | Val | Ala | Met | Ser | Cys | Arg | Tyr | Pro | Gly | Asp | Ile | Arg | Ser | Pro | 3265 | 3270 | 3275 | 3280 |
| Glu | Asp | Leu | Trp | Arg | Met | Leu | Ser | Glu | Gly | Gly | Glu | Gly | Ile | Thr | Pro | 3285 | 3290 | 3295 | |
| Phe | Pro | Thr | Asp | Arg | Gly | Trp | Asp | Leu | Asp | Gly | Leu | Tyr | Asp | Ala | Asp | 3300 | 3305 | 3310 | |
| Pro | Asp | Ala | Leu | Gly | Arg | Ala | Tyr | Val | Arg | Glu | Gly | Gly | Phe | Leu | His | 3315 | 3320 | 3325 | |
| Asp | Ala | Ala | Glu | Phe | Asp | Ala | Glu | Phe | Phe | Gly | Val | Ser | Pro | Arg | Glu | 3330 | 3335 | 3340 | |
| Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln | Arg | Met | Leu | Leu | Thr | Thr | Ser | Trp | 3345 | 3350 | 3355 | 3360 |

Glu Ala Phe Glu Arg Ala Gly Ile Glu Pro Ala Ser Leu Arg Gly Ser
 3365 3370 3375
 Ser Thr Gly Val Phe Ile Gly Leu Ser Tyr Gln Asp Tyr Ala Ala Arg
 3380 3385 3390
 Val Pro Asn Ala Pro Arg Gly Val Glu Gly Tyr Leu Leu Thr Gly Ser
 3395 3400 3405
 Thr Pro Ser Val Ala Ser Gly Arg Ile Ala Tyr Thr Phe Gly Leu Glu
 3410 3415 3420
 Gly Pro Ala Thr Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Thr Ala
 3425 3430 3435 3440
 Leu His Leu Ala Val Arg Ala Leu Arg Ser Gly Glu Cys Thr Met Ala
 3445 3450 3455
 Leu Ala Gly Gly Val Ala Met Met Ala Thr Pro His Met Phe Val Glu
 3460 3465 3470
 Phe Ser Arg Gln Arg Ala Leu Ala Pro Asp Gly Arg Ser Lys Ala Phe
 3475 3480 3485
 Ser Ala Asp Ala Asp Gly Phe Gly Ala Ala Glu Gly Val Gly Leu Leu
 3490 3495 3500
 Leu Val Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly His Pro Val Leu
 3505 3510 3515 3520
 Ala Val Val Arg Gly Thr Ala Val Asn Gln Asp Gly Ala Ser Asn Gly
 3525 3530 3535
 Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala
 3540 3545 3550
 Leu Ala Asp Ala Arg Leu Ala Pro Gly Asp Ile Asp Ala Val Glu Thr
 3555 3560 3565
 His Gly Thr Gly Thr Ser Leu Gly Asp Pro Ile Glu Ala Gln Gly Leu
 3570 3575 3580
 Gln Ala Thr Tyr Gly Lys Glu Arg Pro Ala Glu Arg Pro Leu Ala Ile
 3585 3590 3595 3600
 Gly Ser Val Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Ala
 3605 3610 3615
 Ala Gly Ile Ile Lys Met Val Leu Ala Met Arg His Gly Thr Leu Pro
 3620 3625 3630
 Lys Thr Leu His Ala Asp Glu Pro Ser Pro His Val Asp Trp Ala Asn
 3635 3640 3645
 Ser Gly Leu Ala Leu Val Thr Glu Pro Ile Asp Trp Pro Ala Gly Thr
 3650 3655 3660
 Gly Pro Arg Arg Ala Ala Val Ser Ser Phe Gly Ile Ser Gly Thr Asn
 3665 3670 3675 3680
 Ala His Val Val Leu Glu Gln Ala Pro Asp Ala Ala Gly Glu Val Leu
 3685 3690 3695
 Gly Ala Asp Glu Val Pro Glu Val Ser Glu Thr Val Ala Met Ala Gly
 3700 3705 3710
 Thr Ala Gly Thr Ser Glu Val Ala Glu Gly Ser Glu Ala Ser Glu Ala
 3715 3720 3725
 Pro Ala Ala Pro Gly Ser Arg Glu Ala Ser Leu Pro Gly His Leu Pro
 3730 3735 3740
 Trp Val Leu Ser Ala Lys Asp Glu Gln Ser Leu Arg Gly Gln Ala Ala
 3745 3750 3755 3760
 Ala Leu His Ala Trp Leu Ser Glu Pro Ala Ala Asp Leu Ser Asp Ala
 3765 3770 3775
 Asp Gly Pro Ala Arg Leu Arg Asp Val Gly Tyr Thr Leu Ala Thr Ser
 3780 3785 3790
 Arg Thr Ala Phe Ala His Arg Ala Ala Val Thr Ala Ala Asp Arg Asp
 3795 3800 3805
 Gly Phe Leu Asp Gly Leu Ala Thr Leu Ala Gln Gly Gly Thr Ser Ala
 3810 3815 3820
 His Val His Leu Asp Thr Ala Arg Asp Gly Thr Thr Ala Phe Leu Phe
 3825 3830 3835 3840
 Thr Gly Gln Gly Ser Gln Arg Pro Gly Ala Gly Arg Glu Leu Tyr Asp
 3845 3850 3855

Arg His Pro Val Phe Ala Arg Ala Leu Asp Glu Ile Cys Ala His Leu
 3860 3865 3870
 Asp Gly His Leu Glu Leu Pro Leu Leu Asp Val Met Phe Ala Ala Glu
 3875 3880 3885
 Gly Ser Ala Glu Ala Ala Leu Leu Asp Glu Thr Arg Tyr Thr Gln Cys
 3890 3895 3900
 Ala Leu Phe Ala Leu Glu Val Ala Leu Phe Arg Leu Val Glu Ser Trp
 3905 3910 3915 3920
 Gly Met Arg Pro Ala Ala Leu Leu Gly His Ser Val Gly Glu Ile Ala
 3925 3930 3935
 Ala Ala His Val Ala Gly Val Phe Ser Leu Ala Asp Ala Ala Arg Leu
 3940 3945 3950
 Val Ala Ala Arg Gly Arg Leu Met Gln Glu Leu Pro Ala Gly Gly Ala
 3955 3960 3965
 Met Leu Ala Val Gln Ala Ala Glu Asp Glu Ile Arg Val Trp Leu Glu
 3970 3975 3980
 Thr Glu Glu Arg Tyr Ala Gly Arg Leu Asp Val Ala Ala Val Asn Gly
 3985 3990 3995 4000
 Pro Glu Ala Ala Val Leu Ser Gly Asp Ala Asp Ala Ala Arg Glu Ala
 4005 4010 4015
 Glu Ala Tyr Trp Ser Gly Leu Gly Arg Arg Thr Arg Ala Leu Arg Val
 4020 4025 4030
 Ser His Ala Phe His Ser Ala His Met Asp Gly Met Leu Asp Gly Phe
 4035 4040 4045
 Arg Ala Val Leu Glu Thr Val Glu Phe Arg Arg Pro Ser Leu Thr Val
 4050 4055 4060
 Val Ser Asn Val Thr Gly Leu Ala Ala Gly Pro Asp Asp Leu Cys Asp
 4065 4070 4075 4080
 Pro Glu Tyr Trp Val Arg His Val Arg Gly Thr Val Arg Phe Leu Asp
 4085 4090 4095
 Gly Val Arg Val Leu Arg Asp Leu Gly Val Arg Thr Cys Leu Glu Leu
 4100 4105 4110
 Gly Pro Asp Gly Val Leu Thr Ala Met Ala Ala Asp Gly Leu Ala Asp
 4115 4120 4125
 Thr Pro Ala Asp Ser Ala Ala Gly Ser Pro Val Gly Ser Pro Ala Gly
 4130 4135 4140
 Ser Pro Ala Asp Ser Ala Ala Gly Ala Leu Arg Pro Arg Pro Leu Leu
 4145 4150 4155 4160
 Val Ala Leu Leu Arg Arg Lys Arg Ser Glu Thr Glu Thr Val Ala Asp
 4165 4170 4175
 Ala Leu Gly Arg Ala His Ala His Gly Thr Gly Pro Asp Trp His Ala
 4180 4185 4190
 Trp Phe Ala Gly Ser Gly Ala His Arg Val Asp Leu Pro Thr Tyr Ser
 4195 4200 4205
 Phe Arg Arg Asp Arg Tyr Trp Leu Asp Ala Pro Ala Ala Asp Thr Ala
 4210 4215 4220
 Val Asp Thr Ala Gly Leu Gly Leu Gly Thr Ala Asp His Pro Leu Leu
 4225 4230 4235 4240
 Gly Ala Val Val Ser Leu Pro Asp Arg Asp Gly Leu Leu Leu Thr Gly
 4245 4250 4255
 Arg Leu Ser Leu Arg Thr His Pro Trp Leu Ala Asp His Ala Val Leu
 4260 4265 4270
 Gly Ser Val Leu Leu Pro Gly Ala Ala Met Val Glu Leu Ala Ala His
 4275 4280 4285
 Ala Ala Glu Ser Ala Gly Leu Arg Asp Val Arg Glu Leu Thr Leu Leu
 4290 4295 4300
 Glu Pro Leu Val Leu Pro Glu His Gly Gly Val Glu Leu Arg Val Thr
 4305 4310 4315 4320
 Val Gly Ala Pro Ala Gly Glu Pro Gly Gly Glu Ser Ala Gly Asp Gly
 4325 4330 4335
 Ala Arg Pro Val Ser Leu His Ser Arg Leu Ala Asp Ala Pro Ala Gly
 4340 4345 4350

Thr Ala Trp Ser Cys His Ala Thr Gly Leu Leu Ala Thr Asp Arg Pro
 4355 4360 4365
 Glu Leu Pro Val Ala Pro Asp Arg Ala Ala Met Trp Pro Pro Gln Gly
 4370 4375 4380
 Ala Glu Glu Val Pro Leu Asp Gly Leu Tyr Glu Arg Leu Asp Gly Asn
 4385 4390 4395 4400
 Gly Leu Ala Phe Gly Pro Leu Phe Gln Gly Leu Asn Ala Val Trp Arg
 4405 4410 4415
 Tyr Glu Gly Glu Val Phe Ala Asp Ile Ala Leu Pro Ala Thr Thr Asn
 4420 4425 4430
 Ala Thr Ala Pro Ala Thr Ala Asn Gly Gly Gly Ser Ala Ala Ala Ala
 4435 4440 4445
 Pro Tyr Gly Ile His Pro Ala Leu Leu Asp Ala Ser Leu His Ala Ile
 4450 4455 4460
 Ala Val Gly Gly Leu Val Asp Glu Pro Glu Leu Val Arg Val Pro Phe
 4465 4470 4475 4480
 His Trp Ser Gly Val Thr Val His Ala Ala Gly Ala Ala Ala Arg
 4485 4490 4495
 Val Arg Leu Ala Ser Ala Gly Thr Asp Ala Val Ser Leu Ser Leu Thr
 4500 4505 4510
 Asp Gly Glu Gly Arg Pro Leu Val Ser Val Glu Arg Leu Thr Leu Arg
 4515 4520 4525
 Pro Val Thr Ala Asp Gln Ala Ala Ala Ser Arg Val Gly Gly Leu Met
 4530 4535 4540
 His Arg Val Ala Trp Arg Pro Tyr Ala Leu Ala Ser Ser Gly Glu Gln
 4545 4550 4555 4560
 Asp Pro His Ala Thr Ser Tyr Gly Pro Thr Ala Val Leu Gly Lys Asp
 4565 4570 4575
 Glu Leu Lys Val Ala Ala Ala Leu Glu Ser Ala Gly Val Glu Val Gly
 4580 4585 4590
 Leu Tyr Pro Asp Leu Ala Ala Leu Ser Gln Asp Val Ala Ala Gly Ala
 4595 4600 4605
 Pro Ala Pro Arg Thr Val Leu Ala Pro Leu Pro Ala Gly Pro Ala Asp
 4610 4615 4620
 Gly Gly Ala Glu Gly Val Arg Gly Thr Val Ala Arg Thr Leu Glu Leu
 4625 4630 4635 4640
 Leu Gln Ala Trp Leu Ala Asp Glu His Leu Ala Gly Thr Arg Leu Leu
 4645 4650 4655
 Leu Val Thr Arg Gly Ala Val Arg Asp Pro Glu Gly Ser Gly Ala Asp
 4660 4665 4670
 Asp Gly Gly Glu Asp Leu Ser His Ala Ala Ala Trp Gly Leu Val Arg
 4675 4680 4685
 Thr Ala Gln Thr Glu Asn Pro Gly Arg Phe Gly Leu Leu Asp Leu Ala
 4690 4695 4700
 Asp Asp Ala Ser Ser Tyr Arg Thr Leu Pro Ser Val Leu Ser Asp Ala
 4705 4710 4715 4720
 Gly Leu Arg Asp Glu Pro Gln Leu Ala Leu His Asp Gly Thr Ile Arg
 4725 4730 4735
 Leu Ala Arg Leu Ala Ser Val Arg Pro Glu Thr Gly Thr Ala Ala Pro
 4740 4745 4750
 Ala Leu Ala Pro Glu Gly Thr Val Leu Leu Thr Gly Gly Thr Gly Gly
 4755 4760 4765
 Leu Gly Gly Leu Val Ala Arg His Val Val Gly Glu Trp Gly Val Arg
 4770 4775 4780
 Arg Leu Leu Leu Val Ser Arg Arg Gly Thr Asp Ala Pro Gly Ala Asp
 4785 4790 4795 4800
 Glu Leu Val His Glu Leu Glu Ala Leu Gly Ala Asp Val Ser Val Ala
 4805 4810 4815
 Ala Cys Asp Val Ala Asp Arg Glu Ala Leu Thr Ala Val Leu Asp Ala
 4820 4825 4830
 Ile Pro Ala Glu His Pro Leu Thr Ala Val Val His Thr Ala Gly Val
 4835 4840 4845

| | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Leu | Ser | Asp | Gly | Thr | Leu | Pro | Ser | Met | Thr | Thr | Glu | Asp | Val | Glu | His |
| 4850 | | | | | | 4855 | | | | | 4860 | | | | |
| Val | Leu | Arg | Pro | Lys | Val | Asp | Ala | Ala | Phe | Leu | Leu | Asp | Glu | Leu | Thr |
| 4865 | | | | | 4870 | | | | | 4875 | | | | | 4880 |
| Ser | Thr | Pro | Ala | Tyr | Asp | Leu | Ala | Ala | Phe | Val | Met | Phe | Ser | Ser | Ala |
| | | | | 4885 | | | | | 4890 | | | | | 4895 | |
| Ala | Ala | Val | Phe | Gly | Gly | Ala | Gly | Gln | Gly | Ala | Tyr | Ala | Ala | Ala | Asn |
| | | | 4900 | | | | | 4905 | | | | | 4910 | | |
| Ala | Thr | Leu | Asp | Ala | Leu | Ala | Trp | Arg | Arg | Arg | Ala | Ala | Gly | Leu | Pro |
| | | 4915 | | | | | 4920 | | | | | | 4925 | | |
| Ala | Leu | Ser | Leu | Gly | Trp | Gly | Leu | Trp | Ala | Glu | Thr | Ser | Gly | Met | Thr |
| | 4930 | | | | | 4935 | | | | | 4940 | | | | |
| Gly | Glu | Leu | Gly | Gln | Ala | Asp | Leu | Arg | Arg | Met | Ser | Arg | Ala | Gly | Ile |
| 4945 | | | | 4950 | | | | | | 4955 | | | | | 4960 |
| Gly | Gly | Ile | Ser | Asp | Ala | Glu | Gly | Ile | Ala | Leu | Leu | Asp | Ala | Ala | Leu |
| | | | 4965 | | | | | 4970 | | | | | | 4975 | |
| Arg | Asp | Asp | Arg | His | Pro | Val | Leu | Leu | Pro | Leu | Arg | Leu | Asp | Ala | Ala |
| | | 4980 | | | | | | 4985 | | | | | 4990 | | |
| Gly | Leu | Arg | Asp | Ala | Ala | Gly | Asn | Asp | Pro | Ala | Gly | Ile | Pro | Ala | Leu |
| | 4995 | | | | | | 5000 | | | | | 5005 | | | |
| Phe | Arg | Asp | Val | Val | Gly | Ala | Arg | Thr | Val | Arg | Ala | Arg | Pro | Ser | Ala |
| | 5010 | | | | | 5015 | | | | | 5020 | | | | |
| Ala | Ser | Ala | Ser | Thr | Thr | Ala | Gly | Thr | Ala | Gly | Thr | Pro | Gly | Thr | Ala |
| 5025 | | | | | 5030 | | | | | 5035 | | | | | 5040 |
| Asp | Gly | Ala | Ala | Glu | Thr | Ala | Ala | Val | Thr | Leu | Ala | Asp | Arg | Ala | Ala |
| | | | 5045 | | | | | | 5050 | | | | | 5055 | |
| Thr | Val | Asp | Gly | Pro | Ala | Arg | Gln | Arg | Leu | Leu | Leu | Glu | Phe | Val | Val |
| | | 5060 | | | | | | 5065 | | | | | 5070 | | |
| Gly | Glu | Val | Ala | Glu | Val | Leu | Gly | His | Ala | Arg | Gly | His | Arg | Ile | Asp |
| | 5075 | | | | | 5080 | | | | | | 5085 | | | |
| Ala | Glu | Arg | Gly | Phe | Leu | Asp | Leu | Gly | Phe | Asp | Ser | Leu | Thr | Ala | Val |
| | 5090 | | | | 5095 | | | | | 5100 | | | | | |
| Glu | Leu | Arg | Asn | Arg | Leu | Asn | Ser | Ala | Gly | Gly | Leu | Ala | Leu | Pro | Ala |
| 5105 | | | | 5110 | | | | | 5115 | | | | | | 5120 |
| Thr | Leu | Val | Phe | Asp | His | Pro | Ser | Pro | Ala | Ala | Leu | Ala | Ser | His | Leu |
| | | | 5125 | | | | | 5130 | | | | | | 5135 | |
| Asp | Ala | Glu | Leu | Pro | Arg | Gly | Ala | Ser | Asp | Gln | Asp | Gly | Ala | Gly | Asn |
| | | 5140 | | | | | | 5145 | | | | | 5150 | | |
| Arg | Asn | Gly | Asn | Glu | Asn | Gly | Thr | Thr | Ala | Ser | Arg | Ser | Thr | Ala | Glu |
| | 5155 | | | | | 5160 | | | | | 5165 | | | | |
| Thr | Asp | Ala | Leu | Leu | Ala | Gln | Leu | Thr | Arg | Leu | Glu | Gly | Ala | Leu | Val |
| | 5170 | | | | 5175 | | | | | 5180 | | | | | |
| Leu | Thr | Gly | Leu | Ser | Asp | Ala | Pro | Gly | Ser | Glu | Glu | Val | Leu | Glu | His |
| 5185 | | | | 5190 | | | | | 5195 | | | | | | 5200 |
| Leu | Arg | Ser | Leu | Arg | Ser | Met | Val | Thr | Gly | Glu | Thr | Gly | Thr | Gly | Thr |
| | | | 5205 | | | | | | 5210 | | | | | 5215 | |
| Ala | Ser | Gly | Ala | Pro | Asp | Gly | Ala | Gly | Ser | Gly | Ala | Glu | Asp | Arg | Pro |
| | | 5220 | | | | | | 5225 | | | | | 5230 | | |
| Trp | Ala | Ala | Gly | Asp | Gly | Ala | Gly | Gly | Gly | Ser | Glu | Asp | Gly | Ala | Gly |
| | 5235 | | | | | 5240 | | | | | | 5245 | | | |
| Val | Pro | Asp | Phe | Met | Asn | Ala | Ser | Ala | Glu | Glu | Leu | Phe | Gly | Leu | Leu |
| | 5250 | | | | 5255 | | | | | | 5260 | | | | |
| Asp | Gln | Asp | Pro | Ser | Thr | Asp | Met | Ser | Thr | Val | Asn | Glu | Glu | Lys | Tyr |
| 5265 | | | | 5270 | | | | | | 5275 | | | | | 5280 |
| Leu | Asp | Tyr | Leu | Arg | Arg | Ala | Thr | Ala | Asp | Leu | His | Glu | Ala | Arg | Gly |
| | | | 5285 | | | | | 5290 | | | | | | 5295 | |
| Arg | Leu | Arg | Glu | Leu | Glu | Ala | Lys | Ala | Gly | Glu | Pro | Val | Ala | Ile | Val |
| | | 5300 | | | | | | 5305 | | | | | 5310 | | |
| Gly | Met | Ala | Cys | Arg | Leu | Pro | Gly | Gly | Val | Ala | Ser | Pro | Glu | Asp | Leu |
| | 5315 | | | | | 5320 | | | | | | 5325 | | | |
| Trp | Arg | Leu | Val | Ala | Gly | Gly | Glu | Asp | Ala | Ile | Ser | Glu | Phe | Pro | Gln |
| | 5330 | | | | | 5335 | | | | | 5340 | | | | |

Asp Arg Gly Trp Asp Val Glu Gly Leu Tyr Asp Pro Asn Pro Glu Ala
 5345 5350 5355 5360
 Thr Gly Lys Ser Tyr Ala Arg Glu Ala Gly Phe Leu Tyr Glu Ala Gly
 5365 5370 5375
 Glu Phe Asp Ala Asp Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala
 5380 5385 5390
 Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Ala Ser Trp Glu Ala Phe
 5395 5400 5405
 Glu His Ala Gly Ile Pro Ala Ala Thr Ala Arg Gly Thr Ser Val Gly
 5410 5415 5420
 Val Phe Thr Gly Val Met Tyr His Asp Tyr Ala Thr Arg Leu Thr Asp
 5425 5430 5435 5440
 Val Pro Glu Gly Ile Glu Gly Tyr Leu Gly Thr Gly Asn Ser Gly Ser
 5445 5450 5455
 Val Ala Ser Gly Arg Val Ala Tyr Thr Leu Gly Leu Glu Gly Pro Ala
 5460 5465 5470
 Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu
 5475 5480 5485
 Ala Val Gln Ala Leu Arg Lys Gly Glu Val Asp Met Ala Leu Ala Gly
 5490 5495 5500
 Gly Val Thr Val Met Ser Thr Pro Ser Thr Phe Val Glu Phe Ser Arg
 5505 5510 5515 5520
 Gln Arg Gly Leu Ala Pro Asp Gly Arg Ser Lys Ser Phe Ser Ser Thr
 5525 5530 5535
 Ala Asp Gly Thr Ser Trp Ser Glu Gly Val Gly Val Leu Leu Val Glu
 5540 5545 5550
 Arg Leu Ser Asp Ala Arg Arg Lys Gly His Arg Ile Leu Ala Val Val
 5555 5560 5565
 Arg Gly Thr Ala Val Asn Gln Asp Gly Ala Ser Ser Gly Leu Thr Ala
 5570 5575 5580
 Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Arg Ala Leu Ala Asp
 5585 5590 5595 5600
 Ala Arg Leu Thr Thr Ser Asp Val Asp Val Val Glu Ala His Gly Thr
 5605 5610 5615
 Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala Val Ile Ala Thr
 5620 5625 5630
 Tyr Gly Gln Gly Arg Asp Gly Glu Gln Pro Leu Arg Leu Gly Ser Leu
 5635 5640 5645
 Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Val Ser Gly Val
 5650 5655 5660
 Ile Lys Met Val Gln Ala Met Arg His Gly Val Leu Pro Lys Thr Leu
 5665 5670 5675 5680
 His Val Glu Lys Pro Thr Asp Gln Val Asp Trp Ser Ala Gly Ala Val
 5685 5690 5695
 Glu Leu Leu Thr Glu Ala Met Asp Trp Pro Asp Lys Gly Asp Gly Gly
 5700 5705 5710
 Leu Arg Arg Ala Ala Val Ser Ser Phe Gly Val Ser Gly Thr Asn Ala
 5715 5720 5725
 His Val Val Leu Glu Glu Ala Pro Ala Ala Glu Glu Thr Pro Ala Ser
 5730 5735 5740
 Glu Ala Thr Pro Ala Val Glu Pro Ser Val Gly Ala Gly Leu Val Pro
 5745 5750 5755 5760
 Trp Leu Val Ser Ala Lys Thr Pro Ala Ala Leu Asp Ala Gln Ile Gly
 5765 5770 5775
 Arg Leu Ala Ala Phe Ala Ser Gln Gly Arg Thr Asp Ala Ala Asp Pro
 5780 5785 5790
 Gly Ala Val Ala Arg Val Leu Ala Gly Gly Arg Ala Glu Phe Glu His
 5795 5800 5805
 Arg Ala Val Val Leu Gly Thr Gly Gln Asp Asp Phe Ala Gln Ala Leu
 5810 5815 5820
 Thr Ala Pro Glu Gly Leu Ile Arg Gly Thr Pro Ser Asp Val Gly Arg
 5825 5830 5835 5840

| | | | | | | | | | | | | | | | | | |
|------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|--|--|
| Val | Ala | Phe | Val | Phe | Pro | Gly | Gln | Gly | Thr | Gln | Trp | Ala | Gly | Met | Gly | | |
| | | | | 5845 | | | | | 5850 | | | | | 5855 | | | |
| Ala | Glu | Leu | Leu | Asp | Val | Ser | Lys | Glu | Phe | Ala | Ala | Ala | Met | Ala | Glu | | |
| | | | | 5860 | | | | 5865 | | | | | 5870 | | | | |
| Cys | Glu | Ser | Ala | Leu | Ser | Arg | Tyr | Val | Asp | Trp | Ser | Leu | Glu | Ala | Val | | |
| | | | | 5875 | | | 5880 | | | | | 5885 | | | | | |
| Val | Arg | Gln | Ala | Pro | Gly | Ala | Pro | Thr | Leu | Glu | Arg | Val | Asp | Val | Val | | |
| | | | | 5890 | | 5895 | | | | | 5900 | | | | | | |
| Gln | Pro | Val | Thr | Phe | Ala | Val | Met | Val | Ser | Leu | Ala | Lys | Val | Trp | Gln | | |
| 5905 | | | | | 5910 | | | | | 5915 | | | | | 5920 | | |
| His | His | Gly | Val | Thr | Pro | Gln | Ala | Val | Val | Gly | His | Ser | Gln | Gly | Glu | | |
| | | | | 5925 | | | | | 5930 | | | | | 5935 | | | |
| Ile | Ala | Ala | Ala | Tyr | Val | Ala | Gly | Ala | Leu | Thr | Leu | Asp | Asp | Ala | Ala | | |
| | | | | 5940 | | | | 5945 | | | | | 5950 | | | | |
| Arg | Val | Val | Thr | Leu | Arg | Ser | Lys | Ser | Ile | Ala | Ala | His | Leu | Ala | Gly | | |
| | | | | 5955 | | | 5960 | | | | | 5965 | | | | | |
| Lys | Gly | Gly | Met | Ile | Ser | Leu | Ala | Leu | Ser | Glu | Glu | Ala | Thr | Arg | Gln | | |
| | | | | 5970 | | 5975 | | | | 5980 | | | | | | | |
| Arg | Ile | Glu | Asn | Leu | His | Gly | Leu | Ser | Ile | Ala | Ala | Val | Asn | Gly | Pro | | |
| 5985 | | | | | 5990 | | | | | 5995 | | | | | 6000 | | |
| Thr | Ala | Thr | Val | Val | Ser | Gly | Asp | Pro | Thr | Gln | Ile | Gln | Glu | Leu | Ala | | |
| | | | | 6005 | | | | | 6010 | | | | | 6015 | | | |
| Gln | Ala | Cys | Glu | Ala | Asp | Gly | Val | Arg | Ala | Arg | Ile | Ile | Pro | Val | Asp | | |
| | | | | 6020 | | | | 6025 | | | | | 6030 | | | | |
| Tyr | Ala | Ser | His | Ser | Ala | His | Val | Glu | Thr | Ile | Glu | Ser | Glu | Leu | Ala | | |
| | | | | 6035 | | | 6040 | | | | | 6045 | | | | | |
| Glu | Val | Leu | Ala | Gly | Leu | Ser | Pro | Arg | Thr | Pro | Glu | Val | Pro | Phe | Phe | | |
| | | | | 6050 | | 6055 | | | | 6060 | | | | | | | |
| Ser | Thr | Leu | Glu | Gly | Ala | Trp | Ile | Thr | Glu | Pro | Val | Leu | Asp | Gly | Thr | | |
| 6065 | | | | | 6070 | | | | 6075 | | | | | | 6080 | | |
| Tyr | Trp | Tyr | Arg | Asn | Leu | Arg | His | Arg | Val | Gly | Phe | Ala | Pro | Ala | Val | | |
| | | | | 6085 | | | | 6090 | | | | | | 6095 | | | |
| Glu | Thr | Leu | Ala | Thr | Asp | Glu | Gly | Phe | Thr | His | Phe | Ile | Glu | Val | Ser | | |
| | | | | 6100 | | | | 6105 | | | | | 6110 | | | | |
| Ala | His | Pro | Val | Leu | Thr | Met | Thr | Leu | Pro | Glu | Thr | Val | Thr | Gly | Leu | | |
| | | | | 6115 | | | 6120 | | | | | 6125 | | | | | |
| Gly | Thr | Leu | Arg | Arg | Glu | Gln | Gly | Gly | Gln | Glu | Arg | Leu | Val | Thr | Ser | | |
| | | | | 6130 | | 6135 | | | | | 6140 | | | | | | |
| Leu | Ala | Glu | Ala | Trp | Thr | Asn | Gly | Leu | Thr | Ile | Asp | Trp | Ala | Pro | Val | | |
| 6145 | | | | | 6150 | | | | 6155 | | | | | | 6160 | | |
| Leu | Pro | Thr | Ala | Thr | Gly | His | His | Pro | Glu | Leu | Pro | Thr | Tyr | Ala | Phe | | |
| | | | | 6165 | | | | 6170 | | | | | | 6175 | | | |
| Gln | Arg | Arg | His | Tyr | Trp | Leu | His | Asp | Ser | Pro | Ala | Val | Gln | Gly | Ser | | |
| | | | | 6180 | | | | 6185 | | | | | 6190 | | | | |
| Val | Gln | Asp | Ser | Trp | Arg | Tyr | Arg | Ile | Asp | Trp | Lys | Arg | Leu | Ala | Val | | |
| | | | | 6195 | | | 6200 | | | | | 6205 | | | | | |
| Ala | Asp | Ala | Ser | Glu | Arg | Ala | Gly | Leu | Ser | Gly | Arg | Trp | Leu | Val | Val | | |
| | | | | 6210 | | 6215 | | | | 6220 | | | | | | | |
| Val | Pro | Glu | Asp | Arg | Ser | Ala | Glu | Ala | Ala | Pro | Val | Leu | Ala | Ala | Leu | | |
| 6225 | | | | | 6230 | | | | | 6235 | | | | | 6240 | | |
| Ser | Gly | Ala | Gly | Ala | Asp | Pro | Val | Gln | Leu | Asp | Val | Ser | Pro | Leu | Gly | | |
| | | | | 6245 | | | | 6250 | | | | | | 6255 | | | |
| Asp | Arg | Gln | Arg | Leu | Ala | Ala | Thr | Leu | Gly | Glu | Ala | Leu | Ala | Ala | Ala | | |
| | | | | 6260 | | | 6265 | | | | | | 6270 | | | | |
| Gly | Gly | Ala | Val | Asp | Gly | Val | Leu | Ser | Leu | Leu | Ala | Trp | Asp | Glu | Ser | | |
| | | | | 6275 | | | 6280 | | | | | 6285 | | | | | |
| Ala | His | Pro | Gly | His | Pro | Ala | Pro | Phe | Thr | Arg | Gly | Thr | Gly | Ala | Thr | | |
| | | | | 6290 | | 6295 | | | | 6300 | | | | | | | |
| Leu | Thr | Leu | Val | Gln | Ala | Leu | Glu | Asp | Ala | Gly | Val | Ala | Ala | Pro | Leu | | |
| 6305 | | | | | 6310 | | | | | 6315 | | | | | 6320 | | |
| Trp | Cys | Val | Thr | His | Gly | Ala | Val | Ser | Val | Gly | Arg | Ala | Asp | His | Val | | |
| | | | | 6325 | | | | | 6330 | | | | | 6335 | | | |

| | | | | | | | | | | | | | | | | | |
|------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|--|--|
| Thr | Ser | Pro | Ala | Gln | Ala | Met | Val | Trp | Gly | Met | Gly | Arg | Val | Ala | Ala | | |
| | | | 6340 | | | | | | 6345 | | | | 6350 | | | | |
| Leu | Glu | His | Pro | Glu | Arg | Trp | Gly | Gly | Leu | Ile | Asp | Leu | Pro | Ser | Asp | | |
| | | 6355 | | | | | 6360 | | | | | 6365 | | | | | |
| Ala | Asp | Arg | Ala | Ala | Leu | Asp | Arg | Met | Thr | Thr | Val | Leu | Ala | Gly | Gly | | |
| | 6370 | | | | | 6375 | | | | | 6380 | | | | | | |
| Thr | Gly | Glu | Asp | Gln | Val | Ala | Val | Arg | Ala | Ser | Gly | Leu | Leu | Ala | Arg | | |
| 6385 | | | | | 6390 | | | | | 6395 | | | | | 6400 | | |
| Arg | Leu | Val | Arg | Ala | Ser | Leu | Pro | Ala | His | Gly | Thr | Ala | Ser | Pro | Trp | | |
| | | | 6405 | | | | | | 6410 | | | | | 6415 | | | |
| Trp | Gln | Ala | Asp | Gly | Thr | Val | Leu | Val | Thr | Gly | Ala | Glu | Glu | Pro | Ala | | |
| | | 6420 | | | | | | 6425 | | | | | 6430 | | | | |
| Ala | Ala | Glu | Ala | Ala | Arg | Arg | Leu | Ala | Arg | Asp | Gly | Ala | Gly | His | Leu | | |
| | 6435 | | | | | | 6440 | | | | | 6445 | | | | | |
| Leu | Leu | His | Thr | Thr | Pro | Ser | Gly | Ser | Glu | Gly | Ala | Glu | Gly | Thr | Ser | | |
| | 6450 | | | | | 6455 | | | | | 6460 | | | | | | |
| Gly | Ala | Ala | Glu | Asp | Ser | Gly | Leu | Ala | Gly | Leu | Val | Ala | Glu | Leu | Ala | | |
| 6465 | | | | | 6470 | | | | | 6475 | | | | | 6480 | | |
| Asp | Leu | Gly | Ala | Thr | Ala | Thr | Val | Val | Thr | Cys | Asp | Leu | Thr | Asp | Ala | | |
| | | | 6485 | | | | | | 6490 | | | | | 6495 | | | |
| Glu | Ala | Ala | Ala | Arg | Leu | Leu | Ala | Gly | Val | Ser | Asp | Ala | His | Pro | Leu | | |
| | | 6500 | | | | | | 6505 | | | | | 6510 | | | | |
| Ser | Ala | Val | Leu | His | Leu | Pro | Pro | Thr | Val | Asp | Ser | Glu | Pro | Leu | Ala | | |
| | 6515 | | | | | | 6520 | | | | | 6525 | | | | | |
| Ala | Thr | Asp | Ala | Asp | Ala | Leu | Ala | Arg | Val | Val | Thr | Ala | Lys | Ala | Thr | | |
| | 6530 | | | | | 6535 | | | | | 6540 | | | | | | |
| Ala | Ala | Leu | His | Leu | Asp | Arg | Leu | Leu | Arg | Glu | Ala | Ala | Ala | Ala | Gly | | |
| 6545 | | | | | 6550 | | | | | 6555 | | | | | 6560 | | |
| Gly | Arg | Pro | Pro | Val | Leu | Val | Leu | Phe | Ser | Ser | Val | Ala | Ala | Ile | Trp | | |
| | | | 6565 | | | | | 6570 | | | | | | 6575 | | | |
| Gly | Gly | Ala | Gly | Gln | Gly | Ala | Tyr | Ala | Ala | Gly | Thr | Ala | Phe | Leu | Asp | | |
| | | 6580 | | | | | | 6585 | | | | | 6590 | | | | |
| Ala | Leu | Ala | Gly | Gln | His | Arg | Ala | Asp | Gly | Pro | Thr | Val | Thr | Ser | Val | | |
| | 6595 | | | | | | 6600 | | | | | 6605 | | | | | |
| Ala | Trp | Ser | Pro | Trp | Glu | Gly | Ser | Arg | Val | Thr | Glu | Gly | Ala | Thr | Gly | | |
| | 6610 | | | | | 6615 | | | | | 6620 | | | | | | |
| Glu | Arg | Leu | Arg | Arg | Leu | Gly | Leu | Arg | Pro | Leu | Ala | Pro | Ala | Thr | Ala | | |
| 6625 | | | | | 6630 | | | | | 6635 | | | | | 6640 | | |
| Leu | Thr | Ala | Leu | Asp | Thr | Ala | Leu | Gly | His | Gly | Asp | Thr | Ala | Val | Thr | | |
| | | | 6645 | | | | | | 6650 | | | | | 6655 | | | |
| Ile | Ala | Asp | Val | Asp | Trp | Ser | Ser | Phe | Ala | Pro | Gly | Phe | Thr | Thr | Ala | | |
| | | 6660 | | | | | | 6665 | | | | | 6670 | | | | |
| Arg | Pro | Gly | Thr | Leu | Leu | Ala | Asp | Leu | Pro | Glu | Ala | Arg | Arg | Ala | Leu | | |
| | 6675 | | | | | | 6680 | | | | | 6685 | | | | | |
| Asp | Glu | Gln | Gln | Ser | Thr | Thr | Ala | Ala | Asp | Asp | Thr | Val | Leu | Ser | Arg | | |
| | 6690 | | | | | 6695 | | | | | 6700 | | | | | | |
| Glu | Leu | Gly | Ala | Leu | Thr | Gly | Ala | Glu | Gln | Gln | Arg | Met | Gln | Glu | | | |
| 6705 | | | | | 6710 | | | | | 6715 | | | | 6720 | | | |
| Leu | Val | Arg | Glu | His | Leu | Ala | Val | Val | Leu | Asn | His | Pro | Ser | Pro | Glu | | |
| | | | 6725 | | | | | | 6730 | | | | | 6735 | | | |
| Ala | Val | Asp | Thr | Gly | Arg | Ala | Phe | Arg | Asp | Leu | Gly | Phe | Asp | Ser | Leu | | |
| | 6740 | | | | | | | 6745 | | | | | 6750 | | | | |
| Thr | Ala | Val | Glu | Leu | Arg | Asn | Arg | Leu | Lys | Asn | Ala | Thr | Gly | Leu | Ala | | |
| | 6755 | | | | | | 6760 | | | | | 6765 | | | | | |
| Leu | Pro | Ala | Thr | Leu | Val | Phe | Asp | Tyr | Pro | Thr | Pro | Arg | Thr | Leu | Ala | | |
| | 6770 | | | | | 6775 | | | | | 6780 | | | | | | |
| Glu | Phe | Leu | Leu | Ala | Glu | Ile | Leu | Gly | Glu | Gln | Ala | Gly | Ala | Gly | Glu | | |
| 6785 | | | | | 6790 | | | | | 6795 | | | | | 6800 | | |
| Gln | Leu | Pro | Val | Asp | Gly | Gly | Val | Asp | Asp | Glu | Pro | Val | Ala | Ile | Val | | |
| | | | 6805 | | | | | | 6810 | | | | | 6815 | | | |
| Gly | Met | Ala | Cys | Arg | Leu | Pro | Gly | Gly | Val | Ala | Ser | Pro | Glu | Asp | Leu | | |
| | | 6820 | | | | | | 6825 | | | | | 6830 | | | | |

Trp Arg Leu Val Ala Gly Gly Glu Asp Ala Ile Ser Gly Phe Pro Gln
 6835 6840 6845
 Asp Arg Gly Trp Asp Val Glu Gly Leu Tyr Asp Pro Asp Pro Asp Ala
 6850 6855 6860
 Ser Gly Arg Thr Tyr Cys Arg Ala Gly Gly Phe Leu Asp Glu Ala Gly
 6865 6870 6875 6880
 Glu Phe Asp Ala Asp Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala
 6885 6890 6895
 Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr Ser Trp Glu Ala Val
 6900 6905 6910
 Glu Asp Ala Gly Ile Asp Pro Thr Ser Leu Gln Gly Gln Gln Val Gly
 6915 6920 6925
 Val Phe Ala Gly Thr Asn Gly Pro His Tyr Glu Pro Leu Leu Arg Asn
 6930 6935 6940
 Thr Ala Glu Asp Leu Glu Gly Tyr Val Gly Thr Gly Asn Ala Ala Ser
 6945 6950 6955 6960
 Ile Met Ser Gly Arg Val Ser Tyr Thr Leu Gly Leu Glu Gly Pro Ala
 6965 6970 6975
 Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu
 6980 6985 6990
 Ala Val Gln Ala Leu Arg Lys Gly Glu Cys Gly Leu Ala Leu Ala Gly
 6995 7000 7005
 Gly Val Thr Val Met Ser Thr Pro Thr Thr Phe Val Glu Phe Ser Arg
 7010 7015 7020
 Gln Arg Gly Leu Ala Glu Asp Gly Arg Ser Lys Ala Phe Ala Ala Ser
 7025 7030 7035 7040
 Ala Asp Gly Phe Gly Pro Ala Glu Gly Val Gly Met Leu Leu Val Glu
 7045 7050 7055
 Arg Leu Ser Asp Ala Arg Arg Asn Gly His Arg Val Leu Ala Val Val
 7060 7065 7070
 Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala
 7075 7080 7085
 Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Arg Ala Leu Ala Asp
 7090 7095 7100
 Ala Arg Leu Thr Thr Ala Asp Val Asp Val Val Glu Ala His Gly Thr
 7105 7110 7115 7120
 Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr
 7125 7130 7135
 Tyr Gly Gln Gly Arg Asp Thr Glu Gln Pro Leu Arg Leu Gly Ser Leu
 7140 7145 7150
 Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Val Ser Gly Ile
 7155 7160 7165
 Ile Lys Met Val Gln Ala Met Arg His Gly Val Leu Pro Lys Thr Leu
 7170 7175 7180
 His Val Asp Arg Pro Ser Asp Gln Ile Asp Trp Ser Ala Gly Thr Val
 7185 7190 7195 7200
 Glu Leu Leu Thr Glu Ala Met Asp Trp Pro Arg Lys Gln Glu Gly Gly
 7205 7210 7215
 Leu Arg Arg Ala Ala Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala
 7220 7225 7230
 His Ile Val Leu Glu Glu Ala Pro Val Asp Glu Asp Ala Pro Ala Asp
 7235 7240 7245
 Glu Pro Ser Val Gly Gly Val Val Pro Trp Leu Val Ser Ala Lys Thr
 7250 7255 7260
 Pro Ala Ala Leu Asp Ala Gln Ile Gly Arg Leu Ala Ala Phe Ala Ser
 7265 7270 7275 7280
 Gln Gly Arg Thr Asp Ala Ala Asp Pro Gly Ala Val Ala Arg Val Leu
 7285 7290 7295
 Ala Gly Gly Arg Ala Gln Phe Glu His Arg Ala Val Ala Leu Gly Thr
 7300 7305 7310
 Gly Gln Asp Asp Leu Ala Ala Ala Leu Ala Ala Pro Glu Gly Leu Val
 7315 7320 7325

Arg Gly Val Ala Ser Gly Val Gly Arg Val Ala Phe Val Phe Pro Gly
 7330 7335 7340
 Gln Gly Thr Gln Trp Ala Gly Met Gly Ala Glu Leu Leu Asp Val Ser
 7345 7350 7355 7360
 Lys Glu Phe Ala Ala Ala Met Ala Glu Cys Glu Ala Ala Leu Ala Pro
 7365 7370 7375
 Tyr Val Asp Trp Ser Leu Glu Ala Val Val Arg Gln Ala Pro Gly Ala
 7380 7385 7390
 Pro Thr Leu Glu Arg Val Asp Val Val Gln Pro Val Thr Phe Ala Val
 7395 7400 7405
 Met Val Ser Leu Ala Lys Val Trp Gln His His Gly Val Thr Pro Gln
 7410 7415 7420
 Ala Val Val Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala
 7425 7430 7435 7440
 Gly Ala Leu Ser Leu Asp Asp Ala Ala Arg Val Val Thr Leu Arg Ser
 7445 7450 7455
 Lys Ser Ile Gly Ala His Leu Ala Gly Gln Gly Gly Met Leu Ser Leu
 7460 7465 7470
 Ala Leu Ser Glu Ala Ala Val Val Glu Arg Leu Ala Gly Phe Asp Gly
 7475 7480 7485
 Leu Ser Val Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly
 7490 7495 7500
 Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln Ala Cys Glu Ala Asp Gly
 7505 7510 7515 7520
 Val Arg Ala Arg Ile Ile Pro Val Asp Tyr Ala Ser His Ser Ala His
 7525 7530 7535
 Val Glu Thr Ile Glu Ser Glu Leu Ala Asp Val Leu Ala Gly Leu Ser
 7540 7545 7550
 Pro Gln Thr Pro Gln Val Pro Phe Ser Thr Leu Glu Gly Ala Trp
 7555 7560 7565
 Ile Thr Glu Pro Ala Leu Asp Gly Gly Tyr Trp Tyr Arg Asn Leu Arg
 7570 7575 7580
 His Arg Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr Asp Glu
 7585 7590 7595 7600
 Gly Phe Thr His Phe Val Glu Val Ser Ala His Pro Val Leu Thr Met
 7605 7610 7615
 Ala Leu Pro Glu Thr Val Thr Gly Leu Gly Thr Leu Arg Arg Asp Asn
 7620 7625 7630
 Gly Gly Gln His Arg Leu Thr Thr Ser Leu Ala Glu Ala Trp Ala Asn
 7635 7640 7645
 Gly Leu Thr Val Asp Trp Ala Ser Leu Leu Pro Thr Thr Thr Thr His
 7650 7655 7660
 Pro Asp Leu Pro Thr Tyr Ala Phe Gln Thr Glu Arg Tyr Trp Pro Gln
 7665 7670 7675 7680
 Pro Asp Leu Ser Ala Ala Gly Asp Ile Thr Ser Ala Gly Leu Gly Ala
 7685 7690 7695
 Ala Glu His Pro Leu Leu Gly Ala Ala Val Ala Leu Ala Asp Ser Asp
 7700 7705 7710
 Gly Cys Leu Leu Thr Gly Ser Leu Ser Leu Arg Thr His Pro Trp Leu
 7715 7720 7725
 Ala Asp His Ala Val Ala Gly Thr Val Leu Leu Pro Gly Thr Ala Phe
 7730 7735 7740
 Val Glu Leu Ala Phe Arg Ala Gly Asp Gln Val Gly Cys Asp Leu Val
 7745 7750 7755 7760
 Glu Glu Leu Thr Leu Asp Ala Pro Leu Val Leu Pro Arg Arg Gly Ala
 7765 7770 7775
 Val Arg Val Gln Leu Ser Val Gly Ala Ser Asp Glu Ser Gly Arg Arg
 7780 7785 7790
 Thr Phe Gly Leu Tyr Ala His Pro Glu Asp Ala Pro Gly Glu Ala Glu
 7795 7800 7805
 Trp Thr Arg His Ala Thr Gly Val Leu Ala Ala Arg Ala Asp Arg Thr
 7810 7815 7820

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| Ala | Pro | Val | Ala | Asp | Pro | Glu | Ala | Trp | Pro | Pro | Pro | Gly | Ala | Glu | Pro | 7825 | 7830 | 7835 | 7840 |
| Val | Asp | Val | Asp | Gly | Leu | Tyr | Glu | Arg | Phe | Ala | Ala | Asn | Gly | Tyr | Gly | 7845 | 7850 | 7855 | |
| Tyr | Gly | Pro | Leu | Phe | Gln | Gly | Val | Arg | Gly | Val | Trp | Arg | Arg | Gly | Asp | 7860 | 7865 | 7870 | |
| Glu | Val | Phe | Ala | Asp | Val | Ala | Leu | Pro | Ala | Glu | Val | Ala | Gly | Ala | Glu | 7875 | 7880 | 7885 | |
| Gly | Ala | Arg | Phe | Gly | Leu | His | Pro | Ala | Leu | Leu | Asp | Ala | Ala | Val | Gln | 7890 | 7895 | 7900 | |
| Ala | Ala | Gly | Ala | Gly | Arg | Gly | Val | Arg | Arg | Gly | His | Ala | Ala | Ala | Val | 7905 | 7910 | 7915 | 7920 |
| Arg | Leu | Glu | Arg | Asp | Leu | Leu | Tyr | Ala | Val | Gly | Ala | Thr | Ala | Leu | Arg | 7925 | 7930 | 7935 | |
| Val | Arg | Leu | Ala | Pro | Ala | Gly | Pro | Asp | Thr | Val | Ser | Val | Ser | Ala | Ala | 7940 | 7945 | 7950 | |
| Asp | Ser | Ser | Gly | Gln | Pro | Val | Phe | Ala | Ala | Asp | Ser | Leu | Thr | Val | Leu | 7955 | 7960 | 7965 | |
| Pro | Val | Asp | Pro | Ala | Gln | Leu | Ala | Ala | Phe | Ser | Asp | Pro | Thr | Leu | Asp | 7970 | 7975 | 7980 | |
| Ala | Leu | His | Leu | Leu | Glu | Trp | Thr | Ala | Trp | Asp | Gly | Ala | Ala | Gln | Ala | 7985 | 7990 | 7995 | 8000 |
| Leu | Pro | Gly | Ala | Val | Val | Leu | Gly | Gly | Asp | Ala | Asp | Gly | Leu | Ala | Ala | 8005 | 8010 | 8015 | |
| Ala | Leu | Arg | Ala | Gly | Gly | Thr | Glu | Val | Leu | Ser | Phe | Pro | Asp | Leu | Thr | 8020 | 8025 | 8030 | |
| Asp | Leu | Val | Glu | Ala | Val | Asp | Arg | Gly | Glu | Thr | Pro | Ala | Pro | Ala | Thr | 8035 | 8040 | 8045 | |
| Val | Leu | Val | Ala | Cys | Pro | Ala | Ala | Gly | Pro | Asp | Gly | Pro | Glu | His | Val | 8050 | 8055 | 8060 | |
| Arg | Glu | Ala | Leu | His | Gly | Ser | Leu | Ala | Leu | Met | Gln | Ala | Trp | Leu | Ala | 8065 | 8070 | 8075 | 8080 |
| Asp | Glu | Arg | Phe | Thr | Asp | Gly | Arg | Leu | Val | Leu | Val | Thr | Arg | Asp | Ala | 8085 | 8090 | 8095 | |
| Val | Ala | Ala | Arg | Ser | Gly | Asp | Gly | Leu | Arg | Ser | Thr | Gly | Gln | Ala | Ala | 8100 | 8105 | 8110 | |
| Val | Trp | Gly | Leu | Gly | Arg | Ser | Ala | Gln | Thr | Glu | Ser | Pro | Gly | Arg | Phe | 8115 | 8120 | 8125 | |
| Val | Leu | Leu | Asp | Leu | Ala | Gly | Glu | Ala | Arg | Thr | Ala | Gly | Asp | Ala | Thr | 8130 | 8135 | 8140 | |
| Ala | Gly | Asp | Gly | Leu | Thr | Thr | Gly | Asp | Ala | Thr | Val | Gly | Gly | Thr | Ser | 8145 | 8150 | 8155 | 8160 |
| Gly | Asp | Ala | Ala | Leu | Gly | Ser | Ala | Leu | Ala | Thr | Ala | Leu | Gly | Ser | Gly | 8165 | 8170 | 8175 | |
| Glu | Pro | Gln | Leu | Ala | Leu | Arg | Asp | Gly | Ala | Leu | Leu | Val | Pro | Arg | Leu | 8180 | 8185 | 8190 | |
| Ala | Arg | Ala | Ala | Ala | Pro | Ala | Ala | Ala | Asp | Gly | Leu | Ala | Ala | Ala | Asp | 8195 | 8200 | 8205 | |
| Gly | Leu | Ala | Ala | Leu | Pro | Leu | Pro | Ala | Ala | Pro | Ala | Leu | Trp | Arg | Leu | 8210 | 8215 | 8220 | |
| Glu | Pro | Gly | Thr | Asp | Gly | Ser | Leu | Glu | Ser | Leu | Thr | Ala | Ala | Pro | Gly | 8225 | 8230 | 8235 | 8240 |
| Asp | Ala | Glu | Thr | Leu | Ala | Pro | Glu | Pro | Leu | Gly | Pro | Gly | Gln | Val | Arg | 8245 | 8250 | 8255 | |
| Ile | Ala | Ile | Arg | Ala | Thr | Gly | Leu | Asn | Phe | Arg | Asp | Val | Leu | Ile | Ala | 8260 | 8265 | 8270 | |
| Leu | Gly | Met | Tyr | Pro | Asp | Pro | Ala | Leu | Met | Gly | Thr | Glu | Gly | Ala | Gly | 8275 | 8280 | 8285 | |
| Val | Val | Thr | Ala | Thr | Gly | Pro | Gly | Val | Thr | His | Leu | Ala | Pro | Gly | Asp | 8290 | 8295 | 8300 | |
| Arg | Val | Met | Gly | Leu | Leu | Ser | Gly | Ala | Tyr | Ala | Pro | Val | Val | Val | Ala | 8305 | 8310 | 8315 | 8320 |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Asp | Ala | Arg | Thr | Val | Ala | Arg | Met | Pro | Glu | Gly | Trp | Thr | Phe | Ala | Gln | 8325 | 8330 | 8335 |
| Gly | Ala | Ser | Val | Pro | Val | Val | Phe | Leu | Thr | Ala | Val | Tyr | Ala | Leu | Arg | 8340 | 8345 | 8350 |
| Asp | Leu | Ala | Asp | Val | Lys | Pro | Gly | Glu | Arg | Leu | Leu | Val | His | Ser | Ala | 8355 | 8360 | 8365 |
| Ala | Gly | Gly | Val | Gly | Met | Ala | Ala | Val | Gln | Leu | Ala | Arg | His | Trp | Gly | 8370 | 8375 | 8380 |
| Val | Glu | Val | His | Gly | Thr | Ala | Ser | His | Gly | Lys | Trp | Asp | Ala | Leu | Arg | 8385 | 8390 | 8395 |
| Ala | Leu | Gly | Leu | Asp | Asp | Ala | His | Ile | Ala | Ser | Ser | Arg | Thr | Leu | Asp | 8405 | 8410 | 8415 |
| Phe | Glu | Ser | Ala | Phe | Arg | Ala | Ala | Ser | Gly | Gly | Ala | Gly | Met | Asp | Val | 8420 | 8425 | 8430 |
| Val | Leu | Asn | Ser | Leu | Ala | Arg | Glu | Phe | Val | Asp | Ala | Ser | Leu | Arg | Leu | 8435 | 8440 | 8445 |
| Leu | Gly | Pro | Gly | Gly | Arg | Phe | Val | Glu | Met | Gly | Lys | Thr | Asp | Val | Arg | 8450 | 8455 | 8460 |
| Asp | Ala | Glu | Arg | Val | Ala | Ala | Asp | His | Pro | Gly | Val | Gly | Tyr | Arg | Ala | 8465 | 8470 | 8475 |
| Phe | Asp | Leu | Gly | Glu | Ala | Gly | Pro | Glu | Arg | Ile | Gly | Glu | Met | Leu | Ala | 8485 | 8490 | 8495 |
| Glu | Val | Ile | Ala | Leu | Phe | Glu | Asp | Gly | Val | Leu | Arg | His | Leu | Pro | Val | 8500 | 8505 | 8510 |
| Thr | Thr | Trp | Asp | Val | Arg | Arg | Ala | Arg | Asp | Ala | Phe | Arg | His | Val | Ser | 8515 | 8520 | 8525 |
| Gln | Ala | Arg | His | Thr | Gly | Lys | Val | Val | Leu | Thr | Met | Pro | Ser | Gly | Leu | 8530 | 8535 | 8540 |
| Asp | Pro | Glu | Gly | Thr | Val | Leu | Leu | Thr | Gly | Gly | Thr | Gly | Ala | Leu | Gly | 8545 | 8550 | 8555 |
| Gly | Ile | Val | Ala | Arg | His | Val | Val | Gly | Glu | Trp | Gly | Val | Arg | Arg | Leu | 8565 | 8570 | 8575 |
| Leu | Leu | Val | Ser | Arg | Arg | Gly | Thr | Asp | Ala | Pro | Gly | Ala | Gly | Glu | Leu | 8580 | 8585 | 8590 |
| Val | His | Glu | Leu | Glu | Ala | Leu | Gly | Ala | Asp | Val | Ser | Val | Ala | Ala | Cys | 8595 | 8600 | 8605 |
| Asp | Val | Ala | Asp | Arg | Glu | Ala | Leu | Thr | Ala | Val | Leu | Asp | Ser | Ile | Pro | 8610 | 8615 | 8620 |
| Ala | Glu | His | Pro | Leu | Thr | Ala | Val | Val | His | Thr | Ala | Gly | Val | Leu | Ser | 8625 | 8630 | 8635 |
| Asp | Gly | Thr | Leu | Pro | Ser | Met | Thr | Ala | Glu | Asp | Val | Glu | His | Val | Leu | 8645 | 8650 | 8655 |
| Arg | Pro | Lys | Val | Asp | Ala | Ala | Phe | Leu | Leu | Asp | Glu | Leu | Thr | Ser | Thr | 8660 | 8665 | 8670 |
| Pro | Gly | Tyr | Asp | Leu | Ala | Ala | Phe | Val | Met | Phe | Ser | Ser | Ala | Ala | Ala | 8675 | 8680 | 8685 |
| Val | Phe | Gly | Gly | Ala | Gly | Gln | Gly | Ala | Tyr | Ala | Ala | Ala | Asn | Ala | Thr | 8690 | 8695 | 8700 |
| Leu | Asp | Ala | Leu | Ala | Trp | Arg | Arg | Arg | Thr | Ala | Gly | Leu | Pro | Ala | Leu | 8705 | 8710 | 8715 |
| Ser | Leu | Gly | Trp | Gly | Leu | Trp | Ala | Glu | Thr | Ser | Gly | Met | Thr | Gly | Gly | 8725 | 8730 | 8735 |
| Leu | Ser | Asp | Thr | Asp | Arg | Ser | Arg | Leu | Ala | Arg | Ser | Gly | Ala | Thr | Pro | 8740 | 8745 | 8750 |
| Met | Asp | Ser | Glu | Leu | Thr | Leu | Ser | Leu | Leu | Asp | Ala | Ala | Met | Arg | Arg | 8755 | 8760 | 8765 |
| Asp | Asp | Pro | Ala | Leu | Val | Pro | Ile | Ala | Leu | Asp | Val | Ala | Ala | Leu | Arg | 8770 | 8775 | 8780 |
| Ala | Gln | Gln | Arg | Asp | Gly | Met | Leu | Ala | Pro | Leu | Leu | Ser | Gly | Leu | Thr | 8785 | 8790 | 8795 |
| Arg | Gly | Ser | Arg | Val | Gly | Gly | Ala | Pro | Val | Asn | Gln | Arg | Arg | Ala | Ala | 8805 | 8810 | 8815 |

Ala Gly Gly Ala Gly Glu Ala Asp Thr Asp Leu Gly Gly Arg Leu Ala
 8820 8825 8830
 Ala Met Thr Pro Asp Asp Arg Val Ala His Leu Arg Asp Leu Val Arg
 8835 8840 8845
 Thr His Val Ala Thr Val Leu Gly His Gly Thr Pro Ser Arg Val Asp
 8850 8855 8860
 Leu Glu Arg Ala Phe Arg Asp Thr Gly Phe Asp Ser Leu Thr Ala Val
 8865 8870 8875 8880
 Glu Leu Arg Asn Arg Leu Asn Ala Ala Thr Gly Leu Arg Leu Pro Ala
 8885 8890 8895
 Thr Leu Val Phe Asp His Pro Thr Pro Gly Glu Leu Ala Gly His Leu
 8900 8905 8910
 Leu Asp Glu Leu Ala Thr Ala Ala Gly Gly Ser Trp Ala Glu Gly Thr
 8915 8920 8925
 Gly Ser Gly Asp Thr Ala Ser Ala Thr Asp Arg Gln Thr Thr Ala Ala
 8930 8935 8940
 Leu Ala Glu Leu Asp Arg Leu Glu Gly Val Leu Ala Ser Leu Ala Pro
 8945 8950 8955 8960
 Ala Ala Gly Gly Arg Pro Glu Leu Ala Ala Arg Leu Arg Ala Leu Ala
 8965 8970 8975
 Ala Ala Leu Gly Asp Asp Gly Asp Asp Ala Thr Asp Leu Asp Glu Ala
 8980 8985 8990
 Ser Asp Asp Asp Leu Phe Ser Phe Ile Asp Lys Glu Leu Gly Asp Ser
 8995 9000 9005
 Asp Phe Met Ala Asn Asn Glu Asp Lys Leu Arg Asp Tyr Leu Lys Arg
 9010 9015 9020
 Val Thr Ala Glu Leu Gln Gln Asn Thr Arg Arg Leu Arg Glu Ile Glu
 9025 9030 9035 9040
 Gly Arg Thr His Glu Pro Val Ala Ile Val Gly Met Ala Cys Arg Leu
 9045 9050 9055
 Pro Gly Gly Val Ala Ser Pro Glu Asp Leu Trp Gln Leu Val Ala Gly
 9060 9065 9070
 Asp Gly Asp Ala Ile Ser Glu Phe Pro Gln Asp Arg Gly Trp Asp Val
 9075 9080 9085
 Glu Gly Leu Tyr Asp Pro Asp Pro Asp Ala Ser Gly Arg Thr Tyr Cys
 9090 9095 9100
 Arg Ser Gly Gly Phe Leu His Asp Ala Gly Glu Phe Asp Ala Asp Phe
 9105 9110 9115 9120
 Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg
 9125 9130 9135
 Leu Ser Leu Thr Thr Ala Trp Glu Ala Ile Glu Ser Ala Gly Ile Asp
 9140 9145 9150
 Pro Thr Ala Leu Lys Gly Ser Gly Leu Gly Val Phe Val Gly Gly Trp
 9155 9160 9165
 His Thr Gly Tyr Thr Ser Gly Gln Thr Thr Ala Val Gln Ser Pro Glu
 9170 9175 9180
 Leu Glu Gly His Leu Val Ser Gly Ala Ala Leu Gly Phe Leu Ser Gly
 9185 9190 9195 9200
 Arg Ile Ala Tyr Val Leu Gly Thr Asp Gly Pro Ala Leu Thr Val Asp
 9205 9210 9215
 Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala
 9220 9225 9230
 Leu Arg Lys Gly Glu Cys Asp Met Ala Leu Ala Gly Gly Val Thr Val
 9235 9240 9245
 Met Pro Asn Ala Asp Leu Phe Val Gln Phe Ser Arg Gln Arg Gly Leu
 9250 9255 9260
 Ala Ala Asp Gly Arg Ser Lys Ala Phe Ala Thr Ser Ala Asp Gly Phe
 9265 9270 9275 9280
 Gly Pro Ala Glu Gly Ala Gly Val Leu Leu Val Glu Arg Leu Ser Asp
 9285 9290 9295
 Ala Arg Arg Asn Gly His Arg Ile Leu Ala Val Val Arg Gly Ser Ala
 9300 9305 9310

| | | | | | | | | | | | | | | | |
|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Val | Asn | Gln | Asp | Gly | Ala | Ser | Asn | Gly | Leu | Thr | Ala | Pro | His | Gly | Pro |
| | 9315 | | | | | | 9320 | | | | | 9325 | | | |
| Ser | Gln | Gln | Arg | Val | Ile | Arg | Arg | Ala | Leu | Ala | Asp | Ala | Arg | Leu | Ala |
| | 9330 | | | | | 9335 | | | | | 9340 | | | | |
| Pro | Gly | Asp | Val | Asp | Val | Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Arg | Leu |
| 9345 | | | | | 9350 | | | | | 9355 | | | | | 9360 |
| Gly | Asp | Pro | Ile | Glu | Ala | Gln | Ala | Leu | Ile | Ala | Thr | Tyr | Gly | Gln | Glu |
| | | | | 9365 | | | | | 9370 | | | | | 9375 | |
| Lys | Ser | Ser | Glu | Gln | Pro | Leu | Arg | Leu | Gly | Ala | Leu | Lys | Ser | Asn | Ile |
| | | | 9380 | | | | | 9385 | | | | | 9390 | | |
| Gly | His | Thr | Gln | Ala | Ala | Ala | Gly | Val | Ala | Gly | Val | Ile | Lys | Met | Val |
| | 9395 | | | | | | 9400 | | | | | 9405 | | | |
| Gln | Ala | Met | Arg | His | Gly | Leu | Leu | Pro | Lys | Thr | Leu | His | Val | Asp | Glu |
| | 9410 | | | | | 9415 | | | | | 9420 | | | | |
| Pro | Ser | Asp | Gln | Ile | Asp | Trp | Ser | Ala | Gly | Thr | Val | Glu | Leu | Leu | Thr |
| 9425 | | | | | 9430 | | | | | 9435 | | | | | 9440 |
| Glu | Ala | Val | Asp | Trp | Pro | Glu | Lys | Gln | Asp | Gly | Gly | Leu | Arg | Arg | Ala |
| | | | | 9445 | | | | | 9450 | | | | | 9455 | |
| Ala | Val | Ser | Ser | Phe | Gly | Ile | Ser | Gly | Thr | Asn | Ala | His | Val | Val | Leu |
| | | | 9460 | | | | | 9465 | | | | | 9470 | | |
| Glu | Glu | Ala | Pro | Ala | Val | Glu | Asp | Ser | Pro | Ala | Val | Glu | Pro | Pro | Ala |
| | 9475 | | | | | | 9480 | | | | | 9485 | | | |
| Gly | Gly | Gly | Val | Val | Pro | Trp | Pro | Val | Ser | Ala | Lys | Thr | Pro | Ala | Ala |
| | 9490 | | | | | 9495 | | | | | 9500 | | | | |
| Leu | Asp | Ala | Gln | Ile | Gly | Gln | Leu | Ala | Ala | Tyr | Ala | Asp | Gly | Arg | Thr |
| 9505 | | | | | 9510 | | | | | 9515 | | | | | 9520 |
| Asp | Val | Asp | Pro | Ala | Val | Ala | Ala | Arg | Ala | Leu | Val | Asp | Ser | Arg | Thr |
| | | | | 9525 | | | | | 9530 | | | | | 9535 | |
| Ala | Met | Glu | His | Arg | Ala | Val | Ala | Val | Gly | Asp | Ser | Arg | Glu | Ala | Leu |
| | | | 9540 | | | | | 9545 | | | | | 9550 | | |
| Arg | Asp | Ala | Leu | Arg | Met | Pro | Glu | Gly | Leu | Val | Arg | Gly | Thr | Ser | Ser |
| | 9555 | | | | | 9560 | | | | | | 9565 | | | |
| Asp | Val | Gly | Arg | Val | Ala | Phe | Val | Phe | Pro | Gly | Gln | Gly | Thr | Gln | Trp |
| | 9570 | | | | | 9575 | | | | | 9580 | | | | |
| Ala | Gly | Met | Gly | Ala | Glu | Leu | Leu | Asp | Ser | Ser | Pro | Glu | Phe | Ala | Ala |
| 9585 | | | | | 9590 | | | | | 9595 | | | | | 9600 |
| Ser | Met | Ala | Glu | Cys | Glu | Thr | Ala | Leu | Ser | Arg | Tyr | Val | Asp | Trp | Ser |
| | | | | 9605 | | | | | 9610 | | | | | 9615 | |
| Leu | Glu | Ala | Val | Val | Arg | Gln | Glu | Pro | Gly | Ala | Pro | Thr | Leu | Asp | Arg |
| | | | 9620 | | | | | 9625 | | | | | 9630 | | |
| Val | Asp | Val | Val | Gln | Pro | Val | Thr | Phe | Ala | Val | Met | Val | Ser | Leu | Ala |
| | 9635 | | | | | | 9640 | | | | | 9645 | | | |
| Lys | Val | Trp | Gln | His | His | Gly | Ile | Thr | Pro | Gln | Ala | Val | Val | Gly | His |
| | 9650 | | | | | 9655 | | | | | 9660 | | | | |
| Ser | Gln | Gly | Glu | Ile | Ala | Ala | Ala | Tyr | Val | Ala | Gly | Ala | Leu | Thr | Leu |
| 9665 | | | | | 9670 | | | | | 9675 | | | | | 9680 |
| Asp | Asp | Ala | Ala | Arg | Val | Val | Thr | Leu | Arg | Ser | Lys | Ser | Ile | Ala | Ala |
| | | | | 9685 | | | | | 9690 | | | | | 9695 | |
| His | Leu | Ala | Gly | Lys | Gly | Gly | Met | Ile | Ser | Leu | Ala | Leu | Asp | Glu | Ala |
| | | | 9700 | | | | | 9705 | | | | | 9710 | | |
| Ala | Val | Leu | Lys | Arg | Leu | Ser | Asp | Phe | Asp | Gly | Leu | Ser | Val | Ala | Ala |
| | 9715 | | | | | | 9720 | | | | | 9725 | | | |
| Val | Asn | Gly | Pro | Thr | Ala | Thr | Val | Val | Ser | Gly | Asp | Pro | Thr | Gln | Ile |
| | 9730 | | | | | 9735 | | | | | 9740 | | | | |
| Glu | Glu | Leu | Ala | Arg | Thr | Cys | Glu | Ala | Asp | Gly | Val | Arg | Ala | Arg | Ile |
| 9745 | | | | | 9750 | | | | | 9755 | | | | | 9760 |
| Ile | Pro | Val | Asp | Tyr | Ala | Ser | His | Ser | Arg | Gln | Val | Glu | Ile | Ile | Glu |
| | | | | 9765 | | | | | 9770 | | | | | 9775 | |
| Lys | Glu | Leu | Ala | Glu | Val | Leu | Ala | Gly | Leu | Ala | Pro | Gln | Ala | Pro | His |
| | | | 9780 | | | | | 9785 | | | | | 9790 | | |
| Val | Pro | Phe | Phe | Ser | Thr | Leu | Glu | Gly | Thr | Trp | Ile | Thr | Glu | Pro | Val |
| | | | 9795 | | | | 9800 | | | | | 9805 | | | |

Leu Asp Gly Thr Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe
 9810 9815 9820
 Ala Pro Ala Val Glu Thr Leu Ala Val Asp Gly Phe Thr His Phe Ile
 9825 9830 9835 9840
 Glu Val Ser Ala His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val
 9845 9850 9855
 Thr Gly Leu Gly Thr Leu Arg Arg Glu Gln Gly Gly Gln Glu Arg Leu
 9860 9865 9870
 Val Thr Ser Leu Ala Glu Ala Trp Ala Asn Gly Leu Thr Ile Asp Trp
 9875 9880 9885
 Ala Pro Ile Leu Pro Thr Ala Thr Gly His His Pro Glu Leu Pro Thr
 9890 9895 9900
 Tyr Ala Phe Gln Thr Glu Arg Phe Trp Leu Gln Ser Ser Ala Pro Thr
 9905 9910 9915 9920
 Ser Ala Ala Asp Asp Trp Arg Tyr Arg Val Glu Trp Lys Pro Leu Thr
 9925 9930 9935
 Ala Ser Gly Gln Ala Asp Leu Ser Gly Arg Trp Ile Val Ala Val Gly
 9940 9945 9950
 Ser Glu Pro Glu Ala Glu Leu Leu Gly Ala Leu Lys Ala Ala Gly Ala
 9955 9960 9965
 Glu Val Asp Val Leu Glu Ala Gly Ala Asp Asp Asp Arg Glu Ala Leu
 9970 9975 9980
 Ala Ala Arg Leu Thr Ala Leu Thr Thr Gly Asp Gly Phe Thr Gly Val
 9985 9990 9995 10000
 Val Ser Leu Leu Asp Asp Leu Val Pro Gln Val Ala Trp Val Gln Ala
 10005 10010 10015
 Leu Gly Asp Ala Gly Ile Lys Ala Pro Leu Trp Ser Val Thr Gln Gly
 10020 10025 10030
 Ala Val Ser Val Gly Arg Leu Asp Thr Pro Ala Asp Pro Asp Arg Ala
 10035 10040 10045
 Met Leu Trp Gly Leu Gly Arg Val Val Ala Leu Glu His Pro Glu Arg
 10050 10055 10060
 Trp Ala Gly Leu Val Asp Leu Pro Ala Gln Pro Asp Ala Ala Ala Leu
 10065 10070 10075 10080
 Ala His Leu Val Thr Ala Leu Ser Gly Ala Thr Gly Glu Asp Gln Ile
 10085 10090 10095
 Ala Ile Arg Thr Thr Gly Leu His Ala Arg Arg Leu Ala Arg Ala Pro
 10100 10105 10110
 Leu His Gly Arg Arg Pro Thr Arg Asp Trp Gln Pro His Gly Thr Val
 10115 10120 10125
 Leu Ile Thr Gly Gly Thr Gly Ala Leu Gly Ser His Ala Ala Arg Trp
 10130 10135 10140
 Met Ala His His Gly Ala Glu His Leu Leu Leu Val Ser Arg Ser Gly
 10145 10150 10155 10160
 Glu Gln Ala Pro Gly Ala Thr Gln Leu Thr Ala Glu Leu Thr Ala Ser
 10165 10170 10175
 Gly Ala Arg Val Thr Ile Ala Ala Cys Asp Val Ala Asp Pro His Ala
 10180 10185 10190
 Met Arg Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr Pro Leu Thr Ala
 10195 10200 10205
 Val Val His Thr Ala Gly Ala Pro Gly Gly Asp Pro Leu Asp Val Thr
 10210 10215 10220
 Gly Pro Glu Asp Ile Ala Arg Ile Leu Gly Ala Lys Thr Ser Gly Ala
 10225 10230 10235 10240
 Glu Val Leu Asp Asp Leu Leu Arg Gly Thr Pro Leu Asp Ala Phe Val
 10245 10250 10255
 Leu Tyr Ser Ser Asn Ala Gly Val Trp Gly Ser Gly Ser Gln Gly Val
 10260 10265 10270
 Tyr Ala Ala Ala Asn Ala His Leu Asp Ala Leu Ala Ala Arg Arg Arg
 10275 10280 10285
 Ala Arg Gly Glu Thr Ala Thr Ser Val Ala Trp Gly Leu Trp Ala Gly
 10290 10295 10300

Asp Gly Met Gly Arg Gly Ala Asp Asp Ala Tyr Trp Gln Arg Arg Gly
 10305 10310 10315 10320
 Ile Arg Pro Met Ser Pro Asp Arg Ala Leu Asp Glu Leu Ala Lys Ala
 10325 10330 10335
 Leu Ser His Asp Glu Thr Phe Val Ala Val Ala Asp Val Asp Trp Glu
 10340 10345 10350
 Arg Phe Ala Pro Ala Phe Thr Val Ser Arg Pro Ser Leu Leu Leu Asp
 10355 10360 10365
 Gly Val Pro Glu Ala Arg Gln Ala Leu Ala Ala Pro Val Gly Ala Pro
 10370 10375 10380
 Ala Pro Gly Asp Ala Ala Val Ala Pro Thr Gly Gln Ser Ser Ala Leu
 10385 10390 10395 10400
 Ala Ala Ile Thr Ala Leu Pro Glu Pro Glu Arg Arg Pro Ala Leu Leu
 10405 10410 10415
 Thr Leu Val Arg Thr His Ala Ala Ala Val Leu Gly His Ser Ser Pro
 10420 10425 10430
 Asp Arg Val Ala Pro Gly Arg Ala Phe Thr Glu Leu Gly Phe Asp Ser
 10435 10440 10445
 Leu Thr Ala Val Gln Leu Arg Asn Gln Leu Ser Thr Val Val Gly Asn
 10450 10455 10460
 Arg Leu Pro Ala Thr Thr Val Phe Asp His Pro Thr Pro Ala Ala Leu
 10465 10470 10475 10480
 Ala Ala His Leu His Glu Ala Tyr Leu Ala Pro Ala Glu Pro Ala Pro
 10485 10490 10495
 Thr Asp Trp Glu Gly Arg Val Arg Arg Ala Leu Ala Glu Leu Pro Leu
 10500 10505 10510
 Asp Arg Leu Arg Asp Ala Gly Val Leu Asp Thr Val Leu Arg Leu Thr
 10515 10520 10525
 Gly Ile Glu Pro Glu Pro Gly Ser Gly Gly Ser Asp Gly Gly Ala Ala
 10530 10535 10540
 Asp Pro Gly Ala Glu Pro Glu Ala Ser Ile Asp Asp Leu Asp Ala Glu
 10545 10550 10555 10560
 Ala Leu Ile Arg Met Ala Leu Gly Pro Arg Asn Thr Met Thr Ser Ser
 10565 10570 10575
 Asn Glu Gln Leu Val Asp Ala Leu Arg Ala Ser Leu Lys Glu Asn Glu
 10580 10585 10590
 Glu Leu Arg Lys Glu Ser Arg Arg Ala Asp Arg Arg Gln Glu Pro
 10595 10600 10605
 Met Ala Ile Val Gly Met Ser Cys Arg Phe Ala Gly Gly Ile Arg Ser
 10610 10615 10620
 Pro Glu Asp Leu Trp Asp Ala Val Ala Ala Gly Lys Asp Leu Val Ser
 10625 10630 10635 10640
 Glu Val Pro Glu Glu Arg Gly Trp Asp Ile Asp Ser Leu Tyr Asp Pro
 10645 10650 10655
 Val Pro Gly Arg Lys Gly Thr Thr Tyr Val Arg Asn Ala Ala Phe Leu
 10660 10665 10670
 Asp Asp Ala Ala Gly Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro Arg
 10675 10680 10685
 Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Gln Leu Leu Glu Ala Ser
 10690 10695 10700
 Trp Glu Val Phe Glu Arg Ala Gly Ile Asp Pro Ala Ser Val Arg Gly
 10705 10710 10715 10720
 Thr Asp Val Gly Val Tyr Val Gly Cys Gly Tyr Gln Asp Tyr Ala Pro
 10725 10730 10735
 Asp Ile Arg Val Ala Pro Glu Gly Thr Gly Gly Tyr Val Val Thr Gly
 10740 10745 10750
 Asn Ser Ser Ala Val Ala Ser Gly Arg Ile Ala Tyr Ser Leu Gly Leu
 10755 10760 10765
 Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val
 10770 10775 10780
 Ala Leu His Leu Ala Leu Lys Gly Leu Arg Asn Gly Asp Cys Ser Thr
 10785 10790 10795 10800

Ala Leu Val Gly Gly Val Ala Val Leu Ala Thr Pro Gly Ala Phe Ile
 10805 10810 10815
 Glu Phe Ser Ser Gln Gln Ala Met Ala Ala Asp Gly Arg Thr Lys Gly
 10820 10825 10830
 Phe Ala Ser Ala Ala Asp Gly Leu Ala Trp Gly Glu Gly Val Ala Val
 10835 10840 10845
 Leu Leu Leu Glu Arg Leu Ser Asp Ala Arg Arg Lys Gly His Arg Val
 10850 10855 10860
 Leu Ala Val Val Arg Gly Ser Ala Ile Asn Gln Asp Gly Ala Ser Asn
 10865 10870 10875 10880
 Gly Leu Thr Ala Pro His Gly Pro Ser Gln Gln His Leu Ile Arg Gln
 10885 10890 10895
 Ala Leu Ala Asp Ala Arg Leu Thr Ser Ser Asp Val Asp Val Val Glu
 10900 10905 10910
 Gly His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala
 10915 10920 10925
 Leu Leu Ala Thr Tyr Gly Gln Gly Arg Ala Pro Gly Gln Pro Leu Arg
 10930 10935 10940
 Leu Gly Thr Leu Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ser Gly
 10945 10950 10955 10960
 Val Ala Gly Val Ile Lys Met Val Gln Ala Leu Arg His Gly Val Leu
 10965 10970 10975
 Pro Lys Thr Leu His Val Asp Glu Pro Thr Asp Gln Val Asp Trp Ser
 10980 10985 10990
 Ala Gly Ser Val Glu Leu Leu Thr Glu Ala Val Asp Trp Pro Glu Arg
 10995 11000 11005
 Pro Gly Arg Leu Arg Arg Ala Gly Val Ser Ala Phe Gly Val Gly Gly
 11010 11015 11020
 Thr Asn Ala His Val Val Leu Glu Glu Ala Pro Ala Val Glu Glu Ser
 11025 11030 11035 11040
 Pro Ala Val Glu Pro Pro Ala Gly Gly Gly Val Val Pro Trp Pro Val
 11045 11050 11055
 Ser Ala Lys Thr Ser Ala Ala Leu Asp Ala Gln Ile Gly Gln Leu Ala
 11060 11065 11070
 Ala Tyr Ala Glu Asp Arg Thr Asp Val Asp Pro Ala Val Ala Ala Arg
 11075 11080 11085
 Ala Leu Val Asp Ser Arg Thr Ala Met Glu His Arg Ala Val Ala Val
 11090 11095 11100
 Gly Asp Ser Arg Glu Ala Leu Arg Asp Ala Leu Arg Met Pro Glu Gly
 11105 11110 11115 11120
 Leu Val Arg Gly Thr Val Thr Asp Pro Gly Arg Val Ala Phe Val Phe
 11125 11130 11135
 Pro Gly Gln Gly Thr Gln Trp Ala Gly Met Gly Ala Glu Leu Leu Asp
 11140 11145 11150
 Ser Ser Pro Glu Phe Ala Ala Ala Met Ala Glu Cys Glu Thr Ala Leu
 11155 11160 11165
 Ser Pro Tyr Val Asp Trp Ser Leu Glu Ala Val Val Arg Gln Ala Pro
 11170 11175 11180
 Ser Ala Pro Thr Leu Asp Arg Val Asp Val Val Gln Pro Val Thr Phe
 11185 11190 11195 11200
 Ala Val Met Val Ser Leu Ala Lys Val Trp Gln His His Gly Ile Thr
 11205 11210 11215
 Pro Glu Ala Val Ile Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr
 11220 11225 11230
 Val Ala Gly Ala Leu Thr Leu Asp Asp Ala Ala Arg Val Val Thr Leu
 11235 11240 11245
 Arg Ser Lys Ser Ile Ala Ala His Leu Ala Gly Lys Gly Gly Met Ile
 11250 11255 11260
 Ser Leu Ala Leu Ser Glu Glu Ala Thr Arg Gln Arg Ile Glu Asn Leu
 11265 11270 11275 11280
 His Gly Leu Ser Ile Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val
 11285 11290 11295

Ser Gly Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln Ala Cys Glu Ala
 11300 11305 11310
 Asp Gly Ile Arg Ala Arg Ile Ile Pro Val Asp Tyr Ala Ser His Ser
 11315 11320 11325
 Ala His Val Glu Thr Ile Glu Asn Glu Leu Ala Asp Val Leu Ala Gly
 11330 11335 11340
 Leu Ser Pro Gln Thr Pro Gln Val Pro Phe Phe Ser Thr Leu Glu Gly
 11345 11350 11355 11360
 Thr Trp Ile Thr Glu Pro Ala Leu Asp Gly Gly Tyr Trp Tyr Arg Asn
 11365 11370 11375
 Leu Arg His Arg Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr
 11380 11385 11390
 Asp Glu Gly Phe Thr His Phe Ile Glu Val Ser Ala His Pro Val Leu
 11395 11400 11405
 Thr Met Thr Leu Pro Asp Lys Val Thr Gly Leu Ala Thr Leu Arg Arg
 11410 11415 11420
 Glu Asp Gly Gly Gln His Arg Leu Thr Thr Ser Leu Ala Glu Ala Trp
 11425 11430 11435 11440
 Ala Asn Gly Leu Ala Leu Asp Trp Ala Ser Leu Leu Pro Ala Thr Gly
 11445 11450 11455
 Ala Leu Ser Pro Ala Val Pro Asp Leu Pro Thr Tyr Ala Phe Gln His
 11460 11465 11470
 Arg Ser Tyr Trp Ile Ser Pro Ala Gly Pro Gly Glu Ala Pro Ala His
 11475 11480 11485
 Thr Ala Ser Gly Arg Glu Ala Val Ala Glu Thr Gly Leu Ala Trp Gly
 11490 11495 11500
 Pro Gly Ala Glu Asp Leu Asp Glu Glu Gly Arg Arg Ser Ala Val Leu
 11505 11510 11515 11520
 Ala Met Val Met Arg Gln Ala Ala Ser Val Leu Arg Cys Asp Ser Pro
 11525 11530 11535
 Glu Glu Val Pro Val Asp Arg Pro Leu Arg Glu Ile Gly Phe Asp Ser
 11540 11545 11550
 Leu Thr Ala Val Asp Phe Arg Asn Arg Val Asn Arg Leu Thr Gly Leu
 11555 11560 11565
 Gln Leu Pro Pro Thr Val Val Phe Gln His Pro Thr Pro Val Ala Leu
 11570 11575 11580
 Ala Glu Arg Ile Ser Asp Glu Leu Ala Glu Arg Asn Trp Ala Val Ala
 11585 11590 11595 11600
 Glu Pro Ser Asp His Glu Gln Ala Glu Glu Lys Ala Ala Ala Pro
 11605 11610 11615
 Ala Gly Ala Arg Ser Gly Ala Asp Thr Gly Ala Gly Ala Gly Met Phe
 11620 11625 11630
 Arg Ala Leu Phe Arg Gln Ala Val Glu Asp Asp Arg Tyr Gly Glu Phe
 11635 11640 11645
 Leu Asp Val Leu Ala Glu Ala Ser Ala Phe Arg Pro Gln Phe Ala Ser
 11650 11655 11660
 Pro Glu Ala Cys Ser Glu Arg Leu Asp Pro Val Leu Leu Ala Gly Gly
 11665 11670 11675 11680
 Pro Thr Asp Arg Ala Glu Gly Arg Ala Val Leu Val Gly Cys Thr Gly
 11685 11690 11695
 Thr Ala Ala Asn Gly Gly Pro His Glu Phe Leu Arg Leu Ser Thr Ser
 11700 11705 11710
 Phe Gln Glu Glu Arg Asp Phe Leu Ala Val Pro Leu Pro Gly Tyr Gly
 11715 11720 11725
 Thr Gly Thr Gly Thr Gly Thr Ala Leu Leu Pro Ala Asp Leu Asp Thr
 11730 11735 11740
 Ala Leu Asp Ala Gln Ala Arg Ala Ile Leu Arg Ala Ala Gly Asp Ala
 11745 11750 11755 11760
 Pro Val Val Leu Leu Gly His Ser Gly Gly Ala Leu Leu Ala His Glu
 11765 11770 11775
 Leu Ala Phe Arg Leu Glu Arg Ala His Gly Ala Pro Pro Ala Gly Ile
 11780 11785 11790

Val Leu Val Asp Pro Tyr Pro Pro Gly His Gln Glu Pro Ile Glu Val
 11795 11800 11805
 Trp Ser Arg Gln Leu Gly Glu Gly Leu Phe Ala Gly Glu Leu Glu Pro
 11810 11815 11820
 Met Ser Asp Ala Arg Leu Leu Ala Met Gly Arg Tyr Ala Arg Phe Leu
 11825 11830 11835 11840
 Ala Gly Pro Arg Pro Gly Arg Ser Ser Ala Pro Val Leu Leu Val Arg
 11845 11850 11855
 Ala Ser Glu Pro Leu Gly Asp Trp Gln Glu Glu Arg Gly Asp Trp Arg
 11860 11865 11870
 Ala His Trp Asp Leu Pro His Thr Val Ala Asp Val Pro Gly Asp His
 11875 11880 11885
 Phe Thr Met Met Arg Asp His Ala Pro Ala Val Ala Glu Ala Val Leu
 11890 11895 11900
 Ser Trp Leu Asp Ala Ile Glu Gly Ile Glu Gly Ala Gly Lys Met Thr
 11905 11910 11915 11920
 Asp Arg Pro Leu Asn Val Asp Ser Gly Leu Trp Ile Arg Arg Phe His
 11925 11930 11935
 Pro Ala Pro Asn Ser Ala Val Arg Leu Val Cys Leu Pro His Ala Gly
 11940 11945 11950
 Gly Ser Ala Ser Tyr Phe Phe Arg Phe Ser Glu Glu Leu His Pro Ser
 11955 11960 11965
 Val Glu Ala Leu Ser Val Gln Tyr Pro Gly Arg Gln Asp Arg Arg Ala
 11970 11975 11980
 Glu Pro Cys Leu Glu Ser Val Glu Glu Leu Ala Glu His Val Val Ala
 11985 11990 11995 12000
 Ala Thr Glu Pro Trp Trp Gln Glu Gly Arg Leu Ala Phe Phe Gly His
 12005 12010 12015
 Ser Leu Gly Ala Ser Val Ala Phe Glu Thr Ala Arg Ile Leu Glu Gln
 12020 12025 12030
 Arg His Gly Val Arg Pro Glu Gly Leu Tyr Val Ser Gly Arg Arg Ala
 12035 12040 12045
 Pro Ser Leu Ala Pro Asp Arg Leu Val His Gln Leu Asp Asp Arg Ala
 12050 12055 12060
 Phe Leu Ala Glu Ile Arg Arg Leu Ser Gly Thr Asp Glu Arg Phe Leu
 12065 12070 12075 12080
 Gln Asp Asp Glu Leu Leu Arg Leu Val Leu Pro Ala Leu Arg Ser Asp
 12085 12090 12095
 Tyr Lys Ala Ala Glu Thr Tyr Leu His Arg Pro Ser Ala Lys Leu Thr
 12100 12105 12110
 Cys Pro Val Met Ala Leu Ala Gly Asp Arg Asp Pro Lys Ala Pro Leu
 12115 12120 12125
 Asn Glu Val Ala Glu Trp Arg Arg His Thr Ser Gly Pro Phe Cys Leu
 12130 12135 12140
 Arg Ala Tyr Ser Gly Gly His Phe Tyr Leu Asn Asp Gln Trp His Glu
 12145 12150 12155 12160
 Ile Cys Asn Asp Ile Ser Asp His Leu Leu Val Thr Arg Gly Ala Pro
 12165 12170 12175
 Asp Ala Arg Val Val Gln Pro Pro Thr Ser Leu Ile Glu Gly Ala Ala
 12180 12185 12190
 Lys Arg Trp Gln Asn Pro Arg
 12195

<210> 7

<211> 1248

<212> DNA

<213> *Streptomyces venezuelae*

<400> 7

gtgaaaagcg ccttatccga cctcgcattc ttcggcggcc ccgccgcttt cgaccagccg 60
 ctcctcgtgg ggcggcccaa ccgcacgcac cgcgccaggc tgtacgagcg gctcgaccgg 120

| | | | | | | |
|-------------|------------|-------------|-------------|-------------|-------------|------|
| gccctcgaca | gccagtggct | gtccaacggc | ggcccgcctcg | tccgcgagtt | cgaggagcgc | 180 |
| gtcgccggggc | tcgcccgggt | ccggcatgcc | gtggccacct | gcaacgccac | ggccggggctc | 240 |
| cagctcctcg | cgcacgccgc | cggcctcacc | ggcgaagtga | tcatgccgtc | gatgacgttc | 300 |
| gccgccaccg | cgcacgcact | gcgctggatc | ggcctcacc | cggtcttcgc | cgacatcgac | 360 |
| ccggacaccg | gcaacctcga | cccggaccag | gtggccgccc | cggtcacacc | ccgcacctcg | 420 |
| gccgtcgctcg | gcgtccacct | ctggggccgc | ccctgcgccg | ccgaccagct | gcggaaggctc | 480 |
| gccgacgagc | acggcctgcg | gctgtacttc | gacgcgcgcg | acgccctcgg | ctgcgcgggtc | 540 |
| gacggccggc | ccgccggcag | cctcggcgac | gccgaggtct | tcagcttcca | cgccaccaag | 600 |
| gccgtcaacg | ccttcgaggg | cggcgccgctc | gtcaccgacg | acgccgacct | cgccgcccgg | 660 |
| atccgcgccc | tccacaactt | cggcttcgac | ctgcccggcg | gcagccccgc | cgccggggacc | 720 |
| aacgccaaaga | tgagcgaggc | cgccgcccgc | atgggcctca | cctccctcga | cgcgtttccc | 780 |
| gaggtcatcg | accggaaccg | gcgcaaccac | gccgcctacc | gcgagcacct | cgcggaacctc | 840 |
| cccggcgctcc | tcgtcgccga | ccacgaccgc | cacggcctca | acaaccacca | gtacgtgatc | 900 |
| gtcgagatcg | acgaggccac | caccggcatc | caccgcgacc | tcgtcatgga | ggtcctgaag | 960 |
| gccgaaggcg | tgcacaccgc | cgctacttcc | tcgcccgggt | gccacgagct | ggagccgtac | 1020 |
| cgccgggcagc | cgcacgcccc | gctgccgcac | accgaacgcc | tcgcccgcgcg | cgtgctgtcc | 1080 |
| ctgccgaccg | gcaccgccat | cggcgacgac | gacatccgcc | gggtcgccga | cctgctgcgt | 1140 |
| ctctgcgcga | cccgcggccg | cgaactgacc | gcgcgccacc | gcgacacggc | ccccgccccg | 1200 |
| ctcgcgggccc | cccagacatc | cacgcccacg | attggacgct | cccgatga | | 1248 |

<210> 8

<211> 415

<212> PRT

<213> Streptomyces venezuelae

<400> 8

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Lys | Ser | Ala | Leu | Ser | Asp | Leu | Ala | Phe | Phe | Gly | Gly | Pro | Ala | Ala |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Phe | Asp | Gln | Pro | Leu | Leu | Val | Gly | Arg | Pro | Asn | Arg | Ile | Asp | Arg | Ala |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Arg | Leu | Tyr | Glu | Arg | Leu | Asp | Arg | Ala | Leu | Asp | Ser | Gln | Trp | Leu | Ser |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Asn | Gly | Gly | Pro | Leu | Val | Arg | Glu | Phe | Glu | Glu | Arg | Val | Ala | Gly | Leu |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Ala | Gly | Val | Arg | His | Ala | Val | Ala | Thr | Cys | Asn | Ala | Thr | Ala | Gly | Leu |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Gln | Leu | Leu | Ala | His | Ala | Ala | Gly | Leu | Thr | Gly | Glu | Val | Ile | Met | Pro |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Ser | Met | Thr | Phe | Ala | Ala | Thr | Pro | His | Ala | Leu | Arg | Trp | Ile | Gly | Leu |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Thr | Pro | Val | Phe | Ala | Asp | Ile | Asp | Pro | Asp | Thr | Gly | Asn | Leu | Asp | Pro |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Asp | Gln | Val | Ala | Ala | Ala | Val | Thr | Pro | Arg | Thr | Ser | Ala | Val | Val | Gly |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Val | His | Leu | Trp | Gly | Arg | Pro | Cys | Ala | Ala | Asp | Gln | Leu | Arg | Lys | Val |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Ala | Asp | Glu | His | Gly | Leu | Arg | Leu | Tyr | Phe | Asp | Ala | Ala | His | Ala | Leu |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Gly | Cys | Ala | Val | Asp | Gly | Arg | Pro | Ala | Gly | Ser | Leu | Gly | Asp | Ala | Glu |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Val | Phe | Ser | Phe | His | Ala | Thr | Lys | Ala | Val | Asn | Ala | Phe | Glu | Gly | Gly |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Ala | Val | Val | Thr | Asp | Asp | Ala | Asp | Leu | Ala | Ala | Arg | Ile | Arg | Ala | Leu |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| His | Asn | Phe | Gly | Phe | Asp | Leu | Pro | Gly | Gly | Ser | Pro | Ala | Gly | Gly | Thr |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Asn | Ala | Lys | Met | Ser | Glu | Ala | Ala | Ala | Ala | Met | Gly | Leu | Thr | Ser | Leu |
| | | | | 245 | | | | | | 250 | | | | 255 | |
| Asp | Ala | Phe | Pro | Glu | Val | Ile | Asp | Arg | Asn | Arg | Arg | Asn | His | Ala | Ala |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Tyr | Arg | Glu | His | Leu | Ala | Asp | Leu | Pro | Gly | Val | Leu | Val | Ala | Asp | His |
| | | 275 | | | | | 280 | | | | | 285 | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Arg | His | Gly | Leu | Asn | Asn | His | Gln | Tyr | Val | Ile | Val | Glu | Ile | Asp |
| 290 | | | | | 295 | | | | | 300 | | | | | |
| Glu | Ala | Thr | Thr | Gly | Ile | His | Arg | Asp | Leu | Val | Met | Glu | Val | Leu | Lys |
| 305 | | | | 310 | | | | | 315 | | | | | 320 | |
| Ala | Glu | Gly | Val | His | Thr | Arg | Ala | Tyr | Phe | Ser | Pro | Gly | Cys | His | Glu |
| | | | 325 | | | | | 330 | | | | | | 335 | |
| Leu | Glu | Pro | Tyr | Arg | Gly | Gln | Pro | His | Ala | Pro | Leu | Pro | His | Thr | Glu |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Arg | Leu | Ala | Ala | Arg | Val | Leu | Ser | Leu | Pro | Thr | Gly | Thr | Ala | Ile | Gly |
| | | 355 | | | | 360 | | | | | 365 | | | | |
| Asp | Asp | Asp | Ile | Arg | Arg | Val | Ala | Asp | Leu | Leu | Arg | Leu | Cys | Ala | Thr |
| 370 | | | | | 375 | | | | | | 380 | | | | |
| Arg | Gly | Arg | Glu | Leu | Thr | Ala | Arg | His | Arg | Asp | Thr | Ala | Pro | Ala | Pro |
| 385 | | | | 390 | | | | | 395 | | | | | | 400 |
| Leu | Ala | Ala | Pro | Gln | Thr | Ser | Thr | Pro | Thr | Ile | Gly | Arg | Ser | Arg | |
| | | | 405 | | | | | 410 | | | | | | 415 | |

<210> 9

<211> 1458

<212> DNA

<213> Streptomyces venezuelae

<400> 9

| | | | | | | |
|------------|------------|------------|------------|------------|------------|------|
| atgaccgccc | ccgccctttc | cgccaccgcc | ccggccgaac | gctgcgcgca | ccccggagcc | 60 |
| gatctggggg | cggcggtcca | cgccgtcggc | cagaccctcg | ccgccggcgg | cctcgtgccg | 120 |
| cccgcacgag | ccggaacgac | cgcccgccac | ctcgtccggc | tcgccgtgcg | ctacggcaac | 180 |
| agccccttca | ccccgctgga | ggaggcccg | cacgacctgg | gcgtcgaccg | ggacgccttc | 240 |
| cggcgcctcc | tcgcctgttt | cgggcaggtc | ccggagctcc | gcaccgcggg | cgagaccggc | 300 |
| cccgcggggg | cgtactggaa | gaacacctg | ctcccgtcgc | aacagcgcg | cgtcttcgac | 360 |
| cggcgcctcg | ccaggaagcc | cgtcttcgcc | tacagcgtcg | gcctctaccc | cggcccgcac | 420 |
| tgcattgtcc | gctgccactt | ctgcgtccgt | gtgaccggcg | cccgtacga | cccgtccgcc | 480 |
| ctcgacgcgc | gcaacgccat | gttcgggtcg | gtcatcgacg | agataccgc | gggcaacccc | 540 |
| tcggcgatgt | acttctccgg | cggcctggag | ccgtcacca | accccgccct | cgggagcctg | 600 |
| gccgcgcacg | ccaccgacca | cggcctgcgg | cccaccgtct | acacgaactc | cttcgcgctc | 660 |
| accgagcgca | ccctggagcg | ccagcccggc | ctctggggcc | tgcacgccat | ccgcacctcg | 720 |
| ctctacggcc | tcaacgacga | ggagtagcag | cagaccaccg | gcaagaaggc | cgcttccgc | 780 |
| cgcgtccgcg | agaacctgcg | ccgcttcacg | cagctgcgcg | ccgagcgcg | gtcgccgatc | 840 |
| aacctcggtc | tcgcctacat | cgtgctcccg | ggcgtgcct | cccgcctgct | cgacctggtc | 900 |
| gacttcacgc | ccgacctcaa | cgacgcggcg | cagggcagga | cgatcgactt | cgtcaacatt | 960 |
| cgcgaggact | acagcggccg | tgacgacggc | aagctgccgc | aggaggagcg | ggccgagctc | 1020 |
| caggaggccc | tcaacgcctt | cgaggagcgg | gtccgcgagc | gcaccccgcg | actccacatc | 1080 |
| gactacggct | acgccctgaa | cagcctgcgc | accggggccg | acgccgaact | gctgcggatc | 1140 |
| aagcccgcga | ccatgcggcc | caccgcgcac | ccgcaggctc | cggtgcaggt | cgatctcctc | 1200 |
| ggcgacgtgt | acctgtaccg | cgaggccggc | ttccccgacc | tggaacggcg | gacccgctac | 1260 |
| atcgcgggcc | gcgtgacccc | cgacacctcc | ctcaccgagg | tcgtcaggga | cttcgtcgag | 1320 |
| cgcggcggcg | aggtggcggc | cgtcgacggc | gacgagtact | tcattggacg | cttcgatcag | 1380 |
| gtcgtcaccg | cccgcctgaa | ccagctggag | cgcgacgcgc | cggacggctg | ggaggaggcc | 1440 |
| cgcggcttcc | tcgcgtga | | | | | 1458 |

<210> 10

<211> 485

<212> PRT

<213> Streptomyces venezuelae

<400> 10

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Thr | Ala | Pro | Ala | Leu | Ser | Ala | Thr | Ala | Pro | Ala | Glu | Arg | Cys | Ala |
| 1 | | | | 5 | | | | 10 | | | | | | 15 | |
| His | Pro | Gly | Ala | Asp | Leu | Gly | Ala | Ala | Val | His | Ala | Val | Gly | Gln | Thr |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Leu | Ala | Ala | Gly | Gly | Leu | Val | Pro | Pro | Asp | Glu | Ala | Gly | Thr | Thr | Ala |
| | | 35 | | | | | 40 | | | | | 45 | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | His | Leu | Val | Arg | Leu | Ala | Val | Arg | Tyr | Gly | Asn | Ser | Pro | Phe | Thr |
| 50 | | | | | | 55 | | | | | 60 | | | | |
| Pro | Leu | Glu | Glu | Ala | Arg | His | Asp | Leu | Gly | Val | Asp | Arg | Asp | Ala | Phe |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Arg | Arg | Leu | Leu | Ala | Leu | Phe | Gly | Gln | Val | Pro | Glu | Leu | Arg | Thr | Ala |
| | | | | 85 | | | | 90 | | | | | | 95 | |
| Val | Glu | Thr | Gly | Pro | Ala | Gly | Ala | Tyr | Trp | Lys | Asn | Thr | Leu | Leu | Pro |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Leu | Glu | Gln | Arg | Gly | Val | Phe | Asp | Ala | Ala | Leu | Ala | Arg | Lys | Pro | Val |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Phe | Pro | Tyr | Ser | Val | Gly | Leu | Tyr | Pro | Gly | Pro | Thr | Cys | Met | Phe | Arg |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Cys | His | Phe | Cys | Val | Arg | Val | Thr | Gly | Ala | Arg | Tyr | Asp | Pro | Ser | Ala |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Leu | Asp | Ala | Gly | Asn | Ala | Met | Phe | Arg | Ser | Val | Ile | Asp | Glu | Ile | Pro |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Ala | Gly | Asn | Pro | Ser | Ala | Met | Tyr | Phe | Ser | Gly | Gly | Leu | Glu | Pro | Leu |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Thr | Asn | Pro | Gly | Leu | Gly | Ser | Leu | Ala | Ala | His | Ala | Thr | Asp | His | Gly |
| | 195 | | | | | | 200 | | | | | 205 | | | |
| Leu | Arg | Pro | Thr | Val | Tyr | Thr | Asn | Ser | Phe | Ala | Leu | Thr | Glu | Arg | Thr |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Leu | Glu | Arg | Gln | Pro | Gly | Leu | Trp | Gly | Leu | His | Ala | Ile | Arg | Thr | Ser |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Leu | Tyr | Gly | Leu | Asn | Asp | Glu | Glu | Tyr | Glu | Gln | Thr | Thr | Gly | Lys | Lys |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Ala | Ala | Phe | Arg | Arg | Val | Arg | Glu | Asn | Leu | Arg | Arg | Phe | Gln | Gln | Leu |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Arg | Ala | Glu | Arg | Glu | Ser | Pro | Ile | Asn | Leu | Gly | Phe | Ala | Tyr | Ile | Val |
| | 275 | | | | | | 280 | | | | | 285 | | | |
| Leu | Pro | Gly | Arg | Ala | Ser | Arg | Leu | Leu | Asp | Leu | Val | Asp | Phe | Ile | Ala |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Asp | Leu | Asn | Asp | Ala | Gly | Gln | Gly | Arg | Thr | Ile | Asp | Phe | Val | Asn | Ile |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Arg | Glu | Asp | Tyr | Ser | Gly | Arg | Asp | Asp | Gly | Lys | Leu | Pro | Gln | Glu | Glu |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Arg | Ala | Glu | Leu | Gln | Glu | Ala | Leu | Asn | Ala | Phe | Glu | Glu | Arg | Val | Arg |
| | | | | 340 | | | | 345 | | | | | 350 | | |
| Glu | Arg | Thr | Pro | Gly | Leu | His | Ile | Asp | Tyr | Gly | Tyr | Ala | Leu | Asn | Ser |
| | 355 | | | | | | 360 | | | | | 365 | | | |
| Leu | Arg | Thr | Gly | Ala | Asp | Ala | Glu | Leu | Leu | Arg | Ile | Lys | Pro | Ala | Thr |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| Met | Arg | Pro | Thr | Ala | His | Pro | Gln | Val | Ala | Val | Gln | Val | Asp | Leu | Leu |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Gly | Asp | Val | Tyr | Leu | Tyr | Arg | Glu | Ala | Gly | Phe | Pro | Asp | Leu | Asp | Gly |
| | | | | 405 | | | | | 410 | | | | | 415 | |
| Ala | Thr | Arg | Tyr | Ile | Ala | Gly | Arg | Val | Thr | Pro | Asp | Thr | Ser | Leu | Thr |
| | | | 420 | | | | | 425 | | | | | 430 | | |
| Glu | Val | Val | Arg | Asp | Phe | Val | Glu | Arg | Gly | Gly | Glu | Val | Ala | Ala | Val |
| | | 435 | | | | | 440 | | | | | 445 | | | |
| Asp | Gly | Asp | Glu | Tyr | Phe | Met | Asp | Gly | Phe | Asp | Gln | Val | Val | Thr | Ala |
| | 450 | | | | | 455 | | | | | 460 | | | | |
| Arg | Leu | Asn | Gln | Leu | Glu | Arg | Asp | Ala | Ala | Asp | Gly | Trp | Glu | Glu | Ala |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 |
| Arg | Gly | Phe | Leu | Arg | | | | | | | | | | | |
| | | | | 485 | | | | | | | | | | | |

<210> 11

<211> 879

<212> DNA

<213> *Streptomyces venezuelae*

<400> 11
atgaagggaa tagtcctggc cggcggggagc ggaactcggc tgcattccggc gacctcggtc 60
atttcgaagc agattcttcc ggtctacaac aaaccgatga tctactatcc gctgtcggtt 120
ctcatgctcg gcggtattcg cgagattcaa atcatctcga cccccagca catcgaactc 180
ttccagtcgc ttctcggaaa cggcaggcac ctgggaatag aactcgacta tgcggtccag 240
aaagagcccg caggaatcgc ggacgcactt ctgctcggag ccgagcacat cggcgacgac 300
acctgcgccc tgatcctggg cgacaacatc ttccacgggc ccggcctcta cacgctcctg 360
cgggacagca tcgcgcgcct cgacggctgc gtgctcttcg gctaccgggt caaggacccc 420
gagcggtagc gcgtcgccga ggtggacgcg acgggcccgc tgaccgacct cgtcgagaag 480
cccgtcaagc cgcgctccaa cctcgccgtc accggcctct acctctacga caacgacgtc 540
gtcgacatcg ccaagaacat ccggccctcg ccgcgcggcg agctggagat caccgacgtc 600
aaccgcgtct acctggagcg gggccgggccc gaactcgtca acctggggccg cggcttcgcc 660
tggtcgaca ccggcaccca cgactcgctc ctgcggggccg ccagtagct ccaggctctg 720
gaggagcggc agggcgctctg gatcgcgggc cttgaggaga tcgccttcg catgggcttc 780
atcgacgccg aggcctgtca cggcctggga gaaggcctct cccgcaccga gtacggcagc 840
tatctgatgg agatcgccgg ccgcgaggga gccccgtga 879

<210> 12

<211> 292

<212> PRT

<213> Streptomyces venezuelae

<400> 12

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Lys | Gly | Ile | Val | Leu | Ala | Gly | Gly | Ser | Gly | Thr | Arg | Leu | His | Pro |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Ala | Thr | Ser | Val | Ile | Ser | Lys | Gln | Ile | Leu | Pro | Val | Tyr | Asn | Lys | Pro |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Met | Ile | Tyr | Tyr | Pro | Leu | Ser | Val | Leu | Met | Leu | Gly | Gly | Ile | Arg | Glu |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Ile | Gln | Ile | Ile | Ser | Thr | Pro | Gln | His | Ile | Glu | Leu | Phe | Gln | Ser | Leu |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Leu | Gly | Asn | Gly | Arg | His | Leu | Gly | Ile | Glu | Leu | Asp | Tyr | Ala | Val | Gln |
| 65 | | | | 70 | | | | | 75 | | | | | 80 | |
| Lys | Glu | Pro | Ala | Gly | Ile | Ala | Asp | Ala | Leu | Leu | Val | Gly | Ala | Glu | His |
| | | | 85 | | | | | 90 | | | | | 95 | | |
| Ile | Gly | Asp | Asp | Thr | Cys | Ala | Leu | Ile | Leu | Gly | Asp | Asn | Ile | Phe | His |
| | | 100 | | | | | 105 | | | | | 110 | | | |
| Gly | Pro | Gly | Leu | Tyr | Thr | Leu | Leu | Arg | Asp | Ser | Ile | Ala | Arg | Leu | Asp |
| | | 115 | | | | 120 | | | | | | 125 | | | |
| Gly | Cys | Val | Leu | Phe | Gly | Tyr | Pro | Val | Lys | Asp | Pro | Glu | Arg | Tyr | Gly |
| | 130 | | | | 135 | | | | | | 140 | | | | |
| Val | Ala | Glu | Val | Asp | Ala | Thr | Gly | Arg | Leu | Thr | Asp | Leu | Val | Glu | Lys |
| 145 | | | | 150 | | | | | 155 | | | | | 160 | |
| Pro | Val | Lys | Pro | Arg | Ser | Asn | Leu | Ala | Val | Thr | Gly | Leu | Tyr | Leu | Tyr |
| | | | 165 | | | | 170 | | | | | | | 175 | |
| Asp | Asn | Asp | Val | Val | Asp | Ile | Ala | Lys | Asn | Ile | Arg | Pro | Ser | Pro | Arg |
| | | 180 | | | | | 185 | | | | | 190 | | | |
| Gly | Glu | Leu | Glu | Ile | Thr | Asp | Val | Asn | Arg | Val | Tyr | Leu | Glu | Arg | Gly |
| | 195 | | | | | 200 | | | | | 205 | | | | |
| Arg | Ala | Glu | Leu | Val | Asn | Leu | Gly | Arg | Gly | Phe | Ala | Trp | Leu | Asp | Thr |
| | 210 | | | | 215 | | | | | | 220 | | | | |
| Gly | Thr | His | Asp | Ser | Leu | Leu | Arg | Ala | Ala | Gln | Tyr | Val | Gln | Val | Leu |
| 225 | | | | 230 | | | | | 235 | | | | | 240 | |
| Glu | Glu | Arg | Gln | Gly | Val | Trp | Ile | Ala | Gly | Leu | Glu | Glu | Ile | Ala | Phe |
| | | | 245 | | | | | 250 | | | | | | 255 | |
| Arg | Met | Gly | Phe | Ile | Asp | Ala | Glu | Ala | Cys | His | Gly | Leu | Gly | Glu | Gly |
| | | 260 | | | | 265 | | | | | | 270 | | | |
| Leu | Ser | Arg | Thr | Glu | Tyr | Gly | Ser | Tyr | Leu | Met | Glu | Ile | Ala | Gly | Arg |
| | | 275 | | | | 280 | | | | | | 285 | | | |
| Glu | Gly | Ala | Pro | | | | | | | | | | | | |
| | 290 | | | | | | | | | | | | | | |

<210> 13
 <211> 1014
 <212> DNA
 <213> Streptomyces venezuelae

<400> 13
 gtgcggtctt tggtagaccgg aggtgccccg ttcacatcggt cgcacttcgt gcggcagctc 60
 ctgcgccggg cgtaccccgga cgtgccccgc gatgaggtga tcgtcctgga cagcctcacc 120
 tacgcgggca accgcgcca cctcgccccg gtggacgcgg acccgcgact gcgcttcgtc 180
 cacggcgaca tccgcgacgc cggcctcctc gcccgggaac tgcgcggcgt ggacgccatc 240
 gtccacttcg cggccgagag ccacgtggac cgctccatcg cgggcgcgtc cgtgttcacc 300
 gagaccaacg tgcagggcac gcagacgctg ctccagtgcg ccgtcgacgc cggcgtcggc 360
 cgggtcgtgc acgtctccac cgacgaggtg tacgggtcga tcgactccgg ctccctggacc 420
 gagagcagcc cgctggagcc caactcgccc tacgcggcgt ccaaggccgg ctccgacctc 480
 gttgccccgc cctaccaccg gacgtacggc ctcgacgtac ggatcacccg ctgctgcaac 540
 aactacgggc cgtaccagca ccccgagaag ctcatcccc tcttcgtgac gaacctcctc 600
 gacggcggga cgctcccgt gtacggcgac ggcgcgaaac tccgcgagtg ggtgcacacc 660
 gacgaccact gccggggcat cgcgctcgtc ctcgcgggcg gccggggccg cgagatctac 720
 cacatcggcg gcggcctgga gctgaccaac cgcgaactca ccggcatcct cctggactcg 780
 ctcggcgcgc actggtcctc ggtccggaag gtccgcgacc gcaagggcca cgacctgcgc 840
 tactccctcg acggcggcga gatcgagcgc gagctcgggt accgcccga ggtctccttc 900
 gcggacggcc tcgcgcggac cgtccgctgg taccgggaga accgcggctg gtgggagccg 960
 ctcaaggcga ccgccccga gctgccccgc accgccgtgg aggtgtccgc gtga 1014

<210> 14
 <211> 337
 <212> PRT
 <213> Streptomyces venezuelae

<400> 14
 Met Arg Leu Leu Val Thr Gly Gly Ala Gly Phe Ile Gly Ser His Phe
 1 5 10 15
 Val Arg Gln Leu Leu Ala Gly Ala Tyr Pro Asp Val Pro Ala Asp Glu
 20 25 30
 Val Ile Val Leu Asp Ser Leu Thr Tyr Ala Gly Asn Arg Ala Asn Leu
 35 40 45
 Ala Pro Val Asp Ala Asp Pro Arg Leu Arg Phe Val His Gly Asp Ile
 50 55 60
 Arg Asp Ala Gly Leu Leu Ala Arg Glu Leu Arg Gly Val Asp Ala Ile
 65 70 75 80
 Val His Phe Ala Ala Glu Ser His Val Asp Arg Ser Ile Ala Gly Ala
 85 90 95
 Ser Val Phe Thr Glu Thr Asn Val Gln Gly Thr Gln Thr Leu Leu Gln
 100 105 110
 Cys Ala Val Asp Ala Gly Val Gly Arg Val Val His Val Ser Thr Asp
 115 120 125
 Glu Val Tyr Gly Ser Ile Asp Ser Gly Ser Trp Thr Glu Ser Ser Pro
 130 135 140
 Leu Glu Pro Asn Ser Pro Tyr Ala Ala Ser Lys Ala Gly Ser Asp Leu
 145 150 155 160
 Val Ala Arg Ala Tyr His Arg Thr Tyr Gly Leu Asp Val Arg Ile Thr
 165 170 175
 Arg Cys Cys Asn Asn Tyr Gly Pro Tyr Gln His Pro Glu Lys Leu Ile
 180 185 190
 Pro Leu Phe Val Thr Asn Leu Leu Asp Gly Gly Thr Leu Pro Leu Tyr
 195 200 205
 Gly Asp Gly Ala Asn Val Arg Glu Trp Val His Thr Asp Asp His Cys
 210 215 220
 Arg Gly Ile Ala Leu Val Leu Ala Gly Gly Arg Ala Gly Glu Ile Tyr
 225 230 235 240
 His Ile Gly Gly Gly Leu Glu Leu Thr Asn Arg Glu Leu Thr Gly Ile
 245 250 255

Leu Leu Asp Ser Leu Gly Ala Asp Trp Ser Ser Val Arg Lys Val Ala
 260 265 270
 Asp Arg Lys Gly His Asp Leu Arg Tyr Ser Leu Asp Gly Gly Glu Ile
 275 280 285
 Glu Arg Glu Leu Gly Tyr Arg Pro Gln Val Ser Phe Ala Asp Gly Leu
 290 295 300
 Ala Arg Thr Val Arg Trp Tyr Arg Glu Asn Arg Gly Trp Trp Glu Pro
 305 310 315 320
 Leu Lys Ala Thr Ala Pro Gln Leu Pro Ala Thr Ala Val Glu Val Ser
 325 330 335
 Ala

<210> 15
 <211> 1140
 <212> DNA
 <213> Streptomyces venezuelae

<400> 15
 gtgagcagcc gcgcccagac cccccgcgtc cccttcctcg acctcaaggc cgcctacgag 60
 gagctccgcg cggagaccga cggcgcgatc gcccgcgctc tcgactcggg gcgctacctc 120
 ctcggaccgg aactcgaagg attcgaggcg gagttcgccg cgtactgcga gacggaccac 180
 gccgtcggcg tgaacagcgg gatggacgcc ctccagctcg ccctccgagg cctcggcatc 240
 ggaccggggg acgaggtgat cgtccccctc cacacgtaca tcgccagctg gctcgcgggtg 300
 tccgccaccg gcgcgacccc cgtgcccgtc gagccgcacg aggaccaccc caccctggac 360
 ccgctgctcg tcgagaaggc gatcaccccc cgcaccgggg cgctcctccc cgtccacctc 420
 tacgggcacc ccgcccacat ggacgcccctc cgcgagctcg cggaccggca cggcctgcac 480
 atcgtcgagg acgcccgcga ggcccacggc gcccgctacc ggggcccggc gatcggcgcc 540
 gggtcgtcgg tggccgcggt cagcttctac ccgggcaaga acctcgggtg cttcggcgac 600
 ggcgggcgcc tcgtcacccg cgaccccag ctcgccgaac ggctccggat gctccgcaac 660
 tacggctcgc ggcagaagta cagccacgag acgaagggca ccaactcccg cctggacgag 720
 atgcaggccg ccgtgctgcg gatccggctc gccacactgg acagctggaa cggccgcagg 780
 tcggcgctgg ccgaggagta cctctccggg ctgcgcggac tgcccggcat cggcctgccg 840
 gtgaccgcgc ccgacaccga cccggtctgg cacctcttca ccgtgcgcac cgagcgccgc 900
 gacgagctgc gcagccacct cgacgcccgc ggcacgcaca ccctcacgca ctaccgggta 960
 cccgtgcacc tctcgcccgc ctacgcgggc gaggcaccgc cggaaggctc gctcccgcgg 1020
 gccgagagct tcgcgcggca ggtcctcagc ctgccgatcg gcccgcacct ggagcgcccc 1080
 caggcgctgc ggggtgatcga cgccgtgcgc gaatgggccc agcgggtcga ccaggcctag 1140

<210> 16
 <211> 379
 <212> PRT
 <213> Streptomyces venezuelae

<400> 16
 Met Ser Ser Arg Ala Glu Thr Pro Arg Val Pro Phe Leu Asp Leu Lys
 1 5 10 15
 Ala Ala Tyr Glu Glu Leu Arg Ala Glu Thr Asp Ala Ala Ile Ala Arg
 20 25 30
 Val Leu Asp Ser Gly Arg Tyr Leu Leu Gly Pro Glu Leu Glu Gly Phe
 35 40 45
 Glu Ala Glu Phe Ala Ala Tyr Cys Glu Thr Asp His Ala Val Gly Val
 50 55 60
 Asn Ser Gly Met Asp Ala Leu Gln Leu Ala Leu Arg Gly Leu Gly Ile
 65 70 75 80
 Gly Pro Gly Asp Glu Val Ile Val Pro Ser His Thr Tyr Ile Ala Ser
 85 90 95
 Trp Leu Ala Val Ser Ala Thr Gly Ala Thr Pro Val Pro Val Glu Pro
 100 105 110
 His Glu Asp His Pro Thr Leu Asp Pro Leu Leu Val Glu Lys Ala Ile
 115 120 125

Thr Pro Arg Thr Arg Ala Leu Leu Pro Val His Leu Tyr Gly His Pro
 130 135 140
 Ala Asp Met Asp Ala Leu Arg Glu Leu Ala Asp Arg His Gly Leu His
 145 150 155 160
 Ile Val Glu Asp Ala Ala Gln Ala His Gly Ala Arg Tyr Arg Gly Arg
 165 170 175
 Arg Ile Gly Ala Gly Ser Ser Val Ala Ala Phe Ser Phe Tyr Pro Gly
 180 185 190
 Lys Asn Leu Gly Cys Phe Gly Asp Gly Gly Ala Val Val Thr Gly Asp
 195 200 205
 Pro Glu Leu Ala Glu Arg Leu Arg Met Leu Arg Asn Tyr Gly Ser Arg
 210 215 220
 Gln Lys Tyr Ser His Glu Thr Lys Gly Thr Asn Ser Arg Leu Asp Glu
 225 230 235 240
 Met Gln Ala Ala Val Leu Arg Ile Arg Leu Ala His Leu Asp Ser Trp
 245 250 255
 Asn Gly Arg Arg Ser Ala Leu Ala Ala Glu Tyr Leu Ser Gly Leu Ala
 260 265 270
 Gly Leu Pro Gly Ile Gly Leu Pro Val Thr Ala Pro Asp Thr Asp Pro
 275 280 285
 Val Trp His Leu Phe Thr Val Arg Thr Glu Arg Arg Asp Glu Leu Arg
 290 295 300
 Ser His Leu Asp Ala Arg Gly Ile Asp Thr Leu Thr His Tyr Pro Val
 305 310 315 320
 Pro Val His Leu Ser Pro Ala Tyr Ala Gly Glu Ala Pro Pro Glu Gly
 325 330 335
 Ser Leu Pro Arg Ala Glu Ser Phe Ala Arg Gln Val Leu Ser Leu Pro
 340 345 350
 Ile Gly Pro His Leu Glu Arg Pro Gln Ala Leu Arg Val Ile Asp Ala
 355 360 365
 Val Arg Glu Trp Ala Glu Arg Val Asp Gln Ala
 370 375

<210> 17

<211> 714

<212> DNA

<213> Streptomyces venezuelae

<400> 17

| | | | | | | |
|------------|------------|-------------|------------|------------|------------|-----|
| gtgtacgaag | tcgaccacgc | cgacgtctac | gacctcttct | acctgggtcg | cggaaggac | 60 |
| tacgccgccg | aggcctccga | catcgccgac | ctgggtgcgt | cccgtacccc | cgaggcctcc | 120 |
| tcgctcctgg | acgtggcctg | cggtacgggc | acgcatctgg | agcacttcac | caaggagtcc | 180 |
| ggcgacaccg | ccggcctgga | gctgtccgag | gacatgctca | cccacgcccg | caagcggtcg | 240 |
| cccgaagcca | cgctccacca | ggcgacatg | cgggacttcc | ggctcggccg | gaagtctctc | 300 |
| gccgtggtca | gcatgttcag | ctccgtcggc | tacctgaaga | cgaccgagga | actcggcgcg | 360 |
| gccgtcgcct | cgctcgcgga | gcacctggag | cccgggtggc | tcgtcgtcgt | cgagccgtgg | 420 |
| tggttcccg | agaccttcgc | cgacggctgg | gtcagcgccg | acgtcgtccg | ccgtgacggg | 480 |
| cgcaccgtgg | cccgtgtctc | gcactcgggtg | cgggagggga | acgcgacgcg | catggaggtc | 540 |
| cacttcaccg | tggccgaccc | gggcaagggc | gtgcggcact | tctccgacgt | ccatctcatc | 600 |
| accctgttcc | accaggccga | gtacgaggcc | gcgttcacgg | ccgccgggct | gcgcgtcgag | 660 |
| tacctggagg | gcggcccgtc | gggccgtggc | ctcttcgtcg | gcgtccccgc | ctga | 714 |

<210> 18

<211> 237

<212> PRT

<213> Streptomyces venezuelae

<400> 18

Met Tyr Glu Val Asp His Ala Asp Val Tyr Asp Leu Phe Tyr Leu Gly
 1 5 10 15
 Arg Gly Lys Asp Tyr Ala Ala Glu Ala Ser Asp Ile Ala Asp Leu Val
 20 25 30

Arg Ser Arg Thr Pro Glu Ala Ser Ser Leu Leu Asp Val Ala Cys Gly
 35 40 45
 Thr Gly Thr His Leu Glu His Phe Thr Lys Glu Phe Gly Asp Thr Ala
 50 55 60
 Gly Leu Glu Leu Ser Glu Asp Met Leu Thr His Ala Arg Lys Arg Leu
 65 70 75 80
 Pro Asp Ala Thr Leu His Gln Gly Asp Met Arg Asp Phe Arg Leu Gly
 85 90 95
 Arg Lys Phe Ser Ala Val Val Ser Met Phe Ser Ser Val Gly Tyr Leu
 100 105 110
 Lys Thr Thr Glu Glu Leu Gly Ala Val Ala Ser Phe Ala Glu His
 115 120 125
 Leu Glu Pro Gly Gly Val Val Val Glu Pro Trp Trp Phe Pro Glu
 130 135 140
 Thr Phe Ala Asp Gly Trp Val Ser Ala Asp Val Val Arg Arg Asp Gly
 145 150 155 160
 Arg Thr Val Ala Arg Val Ser His Ser Val Arg Glu Gly Asn Ala Thr
 165 170 175
 Arg Met Glu Val His Phe Thr Val Ala Asp Pro Gly Lys Gly Val Arg
 180 185 190
 His Phe Ser Asp Val His Leu Ile Thr Leu Phe His Gln Ala Glu Tyr
 195 200 205
 Glu Ala Ala Phe Thr Ala Ala Gly Leu Arg Val Glu Tyr Leu Glu Gly
 210 215 220
 Gly Pro Ser Gly Arg Gly Leu Phe Val Gly Val Pro Ala
 225 230 235

<210> 19

<211> 1281

<212> DNA

<213> Streptomyces venezuelae

<400> 19

| | | | | | | |
|------------|------------|------------|-------------|-------------|-------------|------|
| atgcgcgtcc | tgctgacctc | gttcgcacat | cacacgcact | actacggcct | ggtgcccttg | 60 |
| gcctggggcg | tgctcgccgc | cgggcacgag | gtgcgggtcg | ccagccagcc | cgcgctcacg | 120 |
| gacaccatca | ccgggtccgg | gctcgcccg | gtgccgggtcg | gcaccgacca | cctcatccac | 180 |
| gagtaccggg | tgcgatggc | gggcgagccg | cgcccgaacc | atccggcgat | cgctctcgac | 240 |
| gaggcccgtc | ccgagccgct | ggactgggac | cacgccctcg | gcacgaggc | gatcctcgcc | 300 |
| ccgtacttcc | atctgctcgc | caacaacgac | tcgatggtcg | acgacctcgt | cgacttcgcc | 360 |
| cggtcctggc | agccggacct | ggtgctgtgg | gagccgacga | cctacgcggg | cgccgtcgcc | 420 |
| gcccaggtca | ccggtgccgc | gcacgcccg | gtcctgtggg | ggcccagcgt | gatgggcagc | 480 |
| gcccgcgcga | agttcgctgc | gctgcgggac | cggcagccgc | ccgagcaccg | cgaggacccc | 540 |
| accgcggagt | ggctgacgtg | gacgctcgac | cggtacggcg | cctccttcga | agaggagctg | 600 |
| ctcaccggcc | agttcacgat | cgacccgacc | ccgccgagcc | tgcgccctga | cacgggcctg | 660 |
| ccgaccgtcg | ggatgcgtta | tgttccttac | aacggcacgt | cggtcgtgcc | ggactggctg | 720 |
| agtgagccgc | ccgcgcggcc | ccgggtctgc | ctgacctcgc | gcgtctccgc | gcgtgaggtc | 780 |
| ctcggcgccg | acggcgcttc | gcagggcgac | atcctggagg | cgctcgccga | cctcgacatc | 840 |
| gagctcgctg | ccacgctcga | cgcgagtcag | cgcgccgaga | tccgcaacta | cccgaagcac | 900 |
| acccggttca | cggacttcgt | gccgatgcac | gcgtcctgc | cgagctgctc | ggcgatcatc | 960 |
| caccacggcg | gggcgggcac | ctacgcgacc | gccgtgatca | acgcgggtgcc | gcagggtcatg | 1020 |
| ctcgccgagc | tgtgggacgc | gccggtcaag | gcgcggggcg | tcgccgagca | gggggcgggg | 1080 |
| ttcttctctg | cgccggccga | gctcacgcgc | caggccgtgc | gggacgccgt | cgtccgcac | 1140 |
| ctcgacgacc | cctcggtcgc | caccgcgcgc | caccggctgc | gcgaggagac | cttcggcgac | 1200 |
| cccaccccg | ccgggatcgt | ccccgagctg | gagcggctcg | ccgcgcagca | ccgccgccc | 1260 |
| ccggccgacg | cccggcactg | a | | | | 1281 |

<210> 20

<211> 426

<212> PRT

<213> Streptomyces venezuelae

<400> 20

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Arg | Val | Leu | Leu | Thr | Ser | Phe | Ala | His | His | Thr | His | Tyr | Tyr | Gly |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Leu | Val | Pro | Leu | Ala | Trp | Ala | Leu | Leu | Ala | Ala | Gly | His | Glu | Val | Arg |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Val | Ala | Ser | Gln | Pro | Ala | Leu | Thr | Asp | Thr | Ile | Thr | Gly | Ser | Gly | Leu |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Ala | Ala | Val | Pro | Val | Gly | Thr | Asp | His | Leu | Ile | His | Glu | Tyr | Arg | Val |
| | | 50 | | | | 55 | | | | | 60 | | | | |
| Arg | Met | Ala | Gly | Glu | Pro | Arg | Pro | Asn | His | Pro | Ala | Ile | Ala | Phe | Asp |
| 65 | | | | | 70 | | | | 75 | | | | | | 80 |
| Glu | Ala | Arg | Pro | Glu | Pro | Leu | Asp | Trp | Asp | His | Ala | Leu | Gly | Ile | Glu |
| | | | 85 | | | | | 90 | | | | | | 95 | |
| Ala | Ile | Leu | Ala | Pro | Tyr | Phe | His | Leu | Leu | Ala | Asn | Asn | Asp | Ser | Met |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Val | Asp | Asp | Leu | Val | Asp | Phe | Ala | Arg | Ser | Trp | Gln | Pro | Asp | Leu | Val |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Leu | Trp | Glu | Pro | Thr | Thr | Tyr | Ala | Gly | Ala | Val | Ala | Ala | Gln | Val | Thr |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Gly | Ala | Ala | His | Ala | Arg | Val | Leu | Trp | Gly | Pro | Asp | Val | Met | Gly | Ser |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Ala | Arg | Arg | Lys | Phe | Val | Ala | Leu | Arg | Asp | Arg | Gln | Pro | Pro | Glu | His |
| | | | 165 | | | | | | 170 | | | | | 175 | |
| Arg | Glu | Asp | Pro | Thr | Ala | Glu | Trp | Leu | Thr | Trp | Thr | Leu | Asp | Arg | Tyr |
| | | 180 | | | | | | 185 | | | | | 190 | | |
| Gly | Ala | Ser | Phe | Glu | Glu | Glu | Leu | Leu | Thr | Gly | Gln | Phe | Thr | Ile | Asp |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Pro | Thr | Pro | Pro | Ser | Leu | Arg | Leu | Asp | Thr | Gly | Leu | Pro | Thr | Val | Gly |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Met | Arg | Tyr | Val | Pro | Tyr | Asn | Gly | Thr | Ser | Val | Val | Pro | Asp | Trp | Leu |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Ser | Glu | Pro | Pro | Ala | Arg | Pro | Arg | Val | Cys | Leu | Thr | Leu | Gly | Val | Ser |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Ala | Arg | Glu | Val | Leu | Gly | Gly | Asp | Gly | Val | Ser | Gln | Gly | Asp | Ile | Leu |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Glu | Ala | Leu | Ala | Asp | Leu | Asp | Ile | Glu | Leu | Val | Ala | Thr | Leu | Asp | Ala |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Ser | Gln | Arg | Ala | Glu | Ile | Arg | Asn | Tyr | Pro | Lys | His | Thr | Arg | Phe | Thr |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Asp | Phe | Val | Pro | Met | His | Ala | Leu | Leu | Pro | Ser | Cys | Ser | Ala | Ile | Ile |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| His | His | Gly | Gly | Ala | Gly | Thr | Tyr | Ala | Thr | Ala | Val | Ile | Asn | Ala | Val |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Pro | Gln | Val | Met | Leu | Ala | Glu | Leu | Trp | Asp | Ala | Pro | Val | Lys | Ala | Arg |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Ala | Val | Ala | Glu | Gln | Gly | Ala | Gly | Phe | Phe | Leu | Pro | Pro | Ala | Glu | Leu |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Thr | Pro | Gln | Ala | Val | Arg | Asp | Ala | Val | Val | Arg | Ile | Leu | Asp | Asp | Pro |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| Ser | Val | Ala | Thr | Ala | Ala | His | Arg | Leu | Arg | Glu | Glu | Thr | Phe | Gly | Asp |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Pro | Thr | Pro | Ala | Gly | Ile | Val | Pro | Glu | Leu | Glu | Arg | Leu | Ala | Ala | Gln |
| | | | 405 | | | | | 410 | | | | | | 415 | |
| His | Arg | Arg | Pro | Pro | Ala | Asp | Ala | Arg | His | | | | | | |
| | | | 420 | | | | | 425 | | | | | | | |

<210> 21

<211> 1209

<212> DNA

<213> Streptomyces venezuelae

```

<400> 21
gtgaccgacg acctgacggg ggccctcacg cagccccgcg tgggccgcac cgtccgcgcg 60
gtggccgacc gtgaactcgg caccacctc ctggagaccc gcggcatcca ctggatccac 120
gccgcgaacg gcgacccgta cggcaccgtg ctgcgcggcc aggcggacga cccgtatccc 180
gcgtacgagc ggggtgcgtgc ccgcggcgcg ctctccttca gcccgcggg cagctgggtc 240
accgccgatc acgccctggc ggcgagcatc ctctgctcga cggacttcgg ggtctccggc 300
gccgacggcg tcccgggtgc gcagcaggtc ctctcgtacg gggagggctg tccgctggag 360
cgcgagcagg tgctgccggc ggccgggtgac gtgccggagg gcgggcagcg tgccgtggtc 420
gaggggatcc accgggagac gctggagggt ctgcgcggcg acccgtcggc gtcgtacgcc 480
ttcgagctgc tgggcgggtt cgtccgcccc gcggtgacgg ccgctgccgc cgccgtgctg 540
ggtgttcccc cggaccggcg cgcggacttc gcgcatctgc tggagcggct ccggccgctg 600
tccgacagcc tgctggcccc gcagtccctg cggacggtac gggcggcgga cggcgcgctg 660
gccgagctca cggcgctgct cggcgattcg gacgactccc ccggggccct gctgtcggcg 720
ctcgggggtca ccgcagccgt ccagctcacc gggaacgcgg tgctcgcgct cctcgcgcac 780
cccgagcagt ggccgggagct gtgcgacggg cccgggctcg cggcggccgc ggtggaggag 840
accctccgct acgaccgcc ggtgcagctc gacggccggg tggctccgcg ggagacggag 900
ctggcggggc ggccggctgc ggccggggcg catgtcgtcg tcctgaccgc cgcgaccggc 960
cgggacccgg aggtcttcac ggacccggag cgcttcgacc tcgcgcggcc cgacgccgcc 1020
gcgcacctcg cgctgcaccc cgccgggtccg tacggcccgg tggcgtccct ggtccggctt 1080
caggcggagg tcgcgctgcg gaccctggcc gggcggttcc ccgggctgcg gcaggcgggg 1140
gacgtgctcc gccccgcgg cgcgcctgtc ggccgcgggc cgctgagcgt cccggtcagc 1200
agtcctga 1209

```

<210> 22

<211> 402

<212> PRT

<213> *Streptomyces venezuelae*

<400> 22

```

Met Thr Asp Asp Leu Thr Gly Ala Leu Thr Gln Pro Pro Leu Gly Arg
 1          5          10          15
Thr Val Arg Ala Val Ala Asp Arg Glu Leu Gly Thr His Leu Leu Glu
 20          25          30
Thr Arg Gly Ile His Trp Ile His Ala Ala Asn Gly Asp Pro Tyr Ala
 35          40          45
Thr Val Leu Arg Gly Gln Ala Asp Asp Pro Tyr Pro Ala Tyr Glu Arg
 50          55          60
Val Arg Ala Arg Gly Ala Leu Ser Phe Ser Pro Thr Gly Ser Trp Val
 65          70          75          80
Thr Ala Asp His Ala Leu Ala Ala Ser Ile Leu Cys Ser Thr Asp Phe
 85          90          95
Gly Val Ser Gly Ala Asp Gly Val Pro Val Pro Gln Gln Val Leu Ser
100          105          110
Tyr Gly Glu Gly Cys Pro Leu Glu Arg Glu Gln Val Leu Pro Ala Ala
115          120          125
Gly Asp Val Pro Glu Gly Gly Gln Arg Ala Val Val Glu Gly Ile His
130          135          140
Arg Glu Thr Leu Glu Gly Leu Ala Pro Asp Pro Ser Ala Ser Tyr Ala
145          150          155          160
Phe Glu Leu Leu Gly Gly Phe Val Arg Pro Ala Val Thr Ala Ala Ala
165          170          175
Ala Ala Val Leu Gly Val Pro Ala Asp Arg Arg Ala Asp Phe Ala Asp
180          185          190
Leu Leu Glu Arg Leu Arg Pro Leu Ser Asp Ser Leu Leu Ala Pro Gln
195          200          205
Ser Leu Arg Thr Val Arg Ala Ala Asp Gly Ala Leu Ala Glu Leu Thr
210          215          220
Ala Leu Leu Ala Asp Ser Asp Asp Ser Pro Gly Ala Leu Leu Ser Ala
225          230          235          240
Leu Gly Val Thr Ala Ala Val Gln Leu Thr Gly Asn Ala Val Leu Ala
245          250          255

```

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | Leu | Ala | His | Pro | Glu | Gln | Trp | Arg | Glu | Leu | Cys | Asp | Arg | Pro | Gly |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Leu | Ala | Ala | Ala | Ala | Val | Glu | Glu | Thr | Leu | Arg | Tyr | Asp | Pro | Pro | Val |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Gln | Leu | Asp | Ala | Arg | Val | Val | Arg | Gly | Glu | Thr | Glu | Leu | Ala | Gly | Arg |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Arg | Leu | Pro | Ala | Gly | Ala | His | Val | Val | Val | Leu | Thr | Ala | Ala | Thr | Gly |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Arg | Asp | Pro | Glu | Val | Phe | Thr | Asp | Pro | Glu | Arg | Phe | Asp | Leu | Ala | Arg |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Pro | Asp | Ala | Ala | Ala | His | Leu | Ala | Leu | His | Pro | Ala | Gly | Pro | Tyr | Gly |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Pro | Val | Ala | Ser | Leu | Val | Arg | Leu | Gln | Ala | Glu | Val | Ala | Leu | Arg | Thr |
| | | 355 | | | | | 360 | | | | 365 | | | | |
| Leu | Ala | Gly | Arg | Phe | Pro | Gly | Leu | Arg | Gln | Ala | Gly | Asp | Val | Leu | Arg |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| Pro | Arg | Arg | Ala | Pro | Val | Gly | Arg | Gly | Pro | Leu | Ser | Val | Pro | Val | Ser |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Ser | Ser | | | | | | | | | | | | | | |

<210> 23

<211> 2430

<212> DNA

<213> Streptomyces venezuelae

<400> 23

| | | | | | | |
|-------------|------------|-------------|-------------|------------|------------|------|
| gtgacaggta | agacccgaat | accgcgtgtc | cgccgcggcc | gcaccacgcc | cagggccttc | 60 |
| accctggccg | tcgtcggcac | cctgctggcg | ggcaccaccc | tggcgccgc | cgctcccggc | 120 |
| gccgccgaca | cggccaatgt | tcagtacacg | agccgggcgg | cggagctcgt | cgcccagatg | 180 |
| acgctcgacg | agaagatcag | cttcgtccac | tgggcgtgg | accccgaccg | gcagaacgtc | 240 |
| ggctaccttc | ccggcgtgcc | gcgtctgggc | atcccggagc | tgctgcccgc | cgacggcccc | 300 |
| aacggcatcc | gcctgggtgg | gcagaccgcc | accgcgtgc | ccgcgcgggt | cgccctggcc | 360 |
| agcaccttcg | acgacaccat | ggccgacagc | tacggcaagg | tcattgggcc | cgacggtcgc | 420 |
| gcgtcaacc | aggacatggt | cctggggccc | atgatgaaca | acatccgggt | gccgcacggc | 480 |
| ggccggaact | acgagacctt | cagcgaggac | cccctggtct | cctcgcgcac | cgcggtcgcc | 540 |
| cagatcaagg | gcatccaggg | tgccgggtctg | atgaccacgg | ccaagcactt | cgcgcccaac | 600 |
| aaccaggaga | acaaccgctt | ctccgtgaac | gccaatgtcg | acgagcagac | gctccgcgag | 660 |
| atcagagttcc | cggcgttcga | ggcgctcctcc | aaggccggcg | cggcctcctt | catgtgtgcc | 720 |
| tacaacggcc | tcaacgggaa | ggcgctcctgc | ggcaacgacg | agctcctcaa | caacgtgctg | 780 |
| cgcacgcagt | ggggcttcca | gggctgggtg | atgtccgact | ggctcgccac | cccgggcacc | 840 |
| gacgccatca | ccaagggcct | cgaccaggag | atgggcgtcg | agctccccgg | cgacgtcccc | 900 |
| aagggcgagc | cctcgccgcc | ggccaagtgc | ttcggcgagg | cgctgaagac | ggccgtcctg | 960 |
| aacggcacgg | tccccgaggc | ggccgtgacg | cggtcggcgg | agcggatcgt | cgccagatg | 1020 |
| gagaagtctg | gtctgtcctt | cgccactccg | gcgccgcggc | ccgagcgcg | caaggcgggt | 1080 |
| gccagggcgg | tgtcccga | ggtcgccgag | aacggcgccg | tgctcctgcg | caacgagggc | 1140 |
| caggccctgc | cgctcgccgg | tgacgcccgc | aagagcatcg | cggtcatcgg | cccgcggccc | 1200 |
| gtcgacccca | aggtcaccgg | cctgggcagc | gcccacgtcg | tcccggactc | ggcggcggcg | 1260 |
| ccactcgaca | ccatcaaggc | ccgcgcgggt | gcgggtgcga | cggtgacgta | cgagacgggt | 1320 |
| gaggagacct | tcgggacgca | gateccggcg | gggaacctca | gcccggcggt | caaccagggc | 1380 |
| caccagctcg | agccgggcaa | ggcgggggcg | ctgtacgacg | gcacgctgac | cgtgcccgcc | 1440 |
| gacggcgagt | accgcatcgc | ggtccgtgcc | accggtggtt | acgccacggg | gcagctcggc | 1500 |
| agccacacca | tcgaggccgg | tcaggtctac | ggcaagggtg | gcagcccgt | cctcaagctg | 1560 |
| accaagggca | cgcacaagct | cacgatctcg | ggcttcgcga | tgagtgccac | cccgtctctc | 1620 |
| ctggagctgg | gctgggtgac | gccggcgccg | gccgacgcga | cgatcgcgaa | ggcgtggag | 1680 |
| tcggcgcgga | agggccgtac | ggcggtcgtc | ttcgccctacg | acgacggcac | cgagggcgct | 1740 |
| gaccgtccga | acctgtcgct | gccgggtacg | caggacaagc | tgatctcggc | tgtcgcggac | 1800 |
| gccaacccga | acacgatcgt | ggtcctcaac | accggttcgt | cggtgctgat | gccgtggctg | 1860 |
| tccaagacct | gcgcggtcct | ggacatgtgg | tacccgggcc | aggcgggcgc | cgaggccacc | 1920 |
| gccgcgctgc | tctacggtga | cgtcaaccgc | agcggcaagc | tcacgcagag | cttcccggcc | 1980 |
| gccgagaacc | agcacgcggg | cgccggcgac | ccgacaagct | acccgggcgt | cgacaaccag | 2040 |
| cagacgtacc | gcgagggcat | ccacgtcggg | taccgtggtt | tcgacaagga | gaacgtcaag | 2100 |

| | | | | | | |
|------------|-------------|------------|-------------|------------|------------|------|
| ccgctgttcc | cgttcgggca | cggcctgtcg | tacacctcgt | tcacgcagag | cgccccgacc | 2160 |
| gtcgtgcgta | cgtccacggg | tggtctgaag | gtcacgggtca | cggtccgcaa | cagcgggaag | 2220 |
| cgcgccggcc | aggaggtcgt | ccaggcgtac | ctcgggtgcc | gcccgaacgt | gacgggtccg | 2280 |
| caggcgaaga | agaagctcgt | gggtacacg | aaggtctcgc | tcgccgcggg | cgaggcgaag | 2340 |
| acggtgacgg | tgaacgtcga | ccgccgtcag | ctgcagaccg | gttcgtcctc | cgccgacctg | 2400 |
| cggggcagcg | ccacgggtcaa | cgtctggtga | | | | 2430 |

<210> 24

<211> 809

<212> PRT

<213> Streptomyces venezuelae

<400> 24

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Thr | Gly | Lys | Thr | Arg | Ile | Pro | Arg | Val | Arg | Arg | Gly | Arg | Thr | Thr |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Pro | Arg | Ala | Phe | Thr | Leu | Ala | Val | Val | Gly | Thr | Leu | Leu | Ala | Gly | Thr |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Thr | Val | Ala | Ala | Ala | Ala | Pro | Gly | Ala | Ala | Asp | Thr | Ala | Asn | Val | Gln |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Tyr | Thr | Ser | Arg | Ala | Ala | Glu | Leu | Val | Ala | Gln | Met | Thr | Leu | Asp | Glu |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Lys | Ile | Ser | Phe | Val | His | Trp | Ala | Leu | Asp | Pro | Asp | Arg | Gln | Asn | Val |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Gly | Tyr | Leu | Pro | Gly | Val | Pro | Arg | Leu | Gly | Ile | Pro | Glu | Leu | Arg | Ala |
| | | | 85 | | | | | | 90 | | | | | 95 | |
| Ala | Asp | Gly | Pro | Asn | Gly | Ile | Arg | Leu | Val | Gly | Gln | Thr | Ala | Thr | Ala |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Leu | Pro | Ala | Pro | Val | Ala | Leu | Ala | Ser | Thr | Phe | Asp | Asp | Thr | Met | Ala |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Asp | Ser | Tyr | Gly | Lys | Val | Met | Gly | Arg | Asp | Gly | Arg | Ala | Leu | Asn | Gln |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Asp | Met | Val | Leu | Gly | Pro | Met | Met | Asn | Asn | Ile | Arg | Val | Pro | His | Gly |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Gly | Arg | Asn | Tyr | Glu | Thr | Phe | Ser | Glu | Asp | Pro | Leu | Val | Ser | Ser | Arg |
| | | | 165 | | | | | | 170 | | | | | 175 | |
| Thr | Ala | Val | Ala | Gln | Ile | Lys | Gly | Ile | Gln | Gly | Ala | Gly | Leu | Met | Thr |
| | | | 180 | | | | | 185 | | | | | | 190 | |
| Thr | Ala | Lys | His | Phe | Ala | Ala | Asn | Asn | Gln | Glu | Asn | Asn | Arg | Phe | Ser |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Val | Asn | Ala | Asn | Val | Asp | Glu | Gln | Thr | Leu | Arg | Glu | Ile | Glu | Phe | Pro |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Ala | Phe | Glu | Ala | Ser | Ser | Lys | Ala | Gly | Ala | Ala | Ser | Phe | Met | Cys | Ala |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Tyr | Asn | Gly | Leu | Asn | Gly | Lys | Pro | Ser | Cys | Gly | Asn | Asp | Glu | Leu | Leu |
| | | | 245 | | | | | | 250 | | | | | 255 | |
| Asn | Asn | Val | Leu | Arg | Thr | Gln | Trp | Gly | Phe | Gln | Gly | Trp | Val | Met | Ser |
| | | 260 | | | | | | 265 | | | | | 270 | | |
| Asp | Trp | Leu | Ala | Thr | Pro | Gly | Thr | Asp | Ala | Ile | Thr | Lys | Gly | Leu | Asp |
| | 275 | | | | | 280 | | | | | | 285 | | | |
| Gln | Glu | Met | Gly | Val | Glu | Leu | Pro | Gly | Asp | Val | Pro | Lys | Gly | Glu | Pro |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Ser | Pro | Pro | Ala | Lys | Phe | Phe | Gly | Glu | Ala | Leu | Lys | Thr | Ala | Val | Leu |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Asn | Gly | Thr | Val | Pro | Glu | Ala | Ala | Val | Thr | Arg | Ser | Ala | Glu | Arg | Ile |
| | | | 325 | | | | | | 330 | | | | | 335 | |
| Val | Gly | Gln | Met | Glu | Lys | Phe | Gly | Leu | Leu | Ala | Thr | Pro | Ala | Pro | |
| | | 340 | | | | | | 345 | | | | 350 | | | |
| Arg | Pro | Glu | Arg | Asp | Lys | Ala | Gly | Ala | Gln | Ala | Val | Ser | Arg | Lys | Val |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Ala | Glu | Asn | Gly | Ala | Val | Leu | Leu | Arg | Asn | Glu | Gly | Gln | Ala | Leu | Pro |
| | 370 | | | | | 375 | | | | | 380 | | | | |

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | Ala | Gly | Asp | Ala | Gly | Lys | Ser | Ile | Ala | Val | Ile | Gly | Pro | Thr | Ala | 385 | 390 | 395 | 400 |
| Val | Asp | Pro | Lys | Val | Thr | Gly | Leu | Gly | Ser | Ala | His | Val | Val | Pro | Asp | | 405 | 410 | 415 |
| Ser | Ala | Ala | Ala | Pro | Leu | Asp | Thr | Ile | Lys | Ala | Arg | Ala | Gly | Ala | Gly | | 420 | 425 | 430 |
| Ala | Thr | Val | Thr | Tyr | Glu | Thr | Gly | Glu | Glu | Thr | Phe | Gly | Thr | Gln | Ile | | 435 | 440 | 445 |
| Pro | Ala | Gly | Asn | Leu | Ser | Pro | Ala | Phe | Asn | Gln | Gly | His | Gln | Leu | Glu | | 450 | 455 | 460 |
| Pro | Gly | Lys | Ala | Gly | Ala | Leu | Tyr | Asp | Gly | Thr | Leu | Thr | Val | Pro | Ala | | 465 | 470 | 475 |
| Asp | Gly | Glu | Tyr | Arg | Ile | Ala | Val | Arg | Ala | Thr | Gly | Gly | Tyr | Ala | Thr | | 485 | 490 | 495 |
| Val | Gln | Leu | Gly | Ser | His | Thr | Ile | Glu | Ala | Gly | Gln | Val | Tyr | Gly | Lys | | 500 | 505 | 510 |
| Val | Ser | Ser | Pro | Leu | Leu | Lys | Leu | Thr | Lys | Gly | Thr | His | Lys | Leu | Thr | | 515 | 520 | 525 |
| Ile | Ser | Gly | Phe | Ala | Met | Ser | Ala | Thr | Pro | Leu | Ser | Leu | Glu | Leu | Gly | | 530 | 535 | 540 |
| Trp | Val | Thr | Pro | Ala | Ala | Ala | Asp | Ala | Thr | Ile | Ala | Lys | Ala | Val | Glu | | 545 | 550 | 555 |
| Ser | Ala | Arg | Lys | Ala | Arg | Thr | Ala | Val | Val | Phe | Ala | Tyr | Asp | Asp | Gly | | 565 | 570 | 575 |
| Thr | Glu | Gly | Val | Asp | Arg | Pro | Asn | Leu | Ser | Leu | Pro | Gly | Thr | Gln | Asp | | 580 | 585 | 590 |
| Lys | Leu | Ile | Ser | Ala | Val | Ala | Asp | Ala | Asn | Pro | Asn | Thr | Ile | Val | Val | | 595 | 600 | 605 |
| Leu | Asn | Thr | Gly | Ser | Ser | Val | Leu | Met | Pro | Trp | Leu | Ser | Lys | Thr | Arg | | 610 | 615 | 620 |
| Ala | Val | Leu | Asp | Met | Trp | Tyr | Pro | Gly | Gln | Ala | Gly | Ala | Glu | Ala | Thr | | 625 | 630 | 635 |
| Ala | Ala | Leu | Leu | Tyr | Gly | Asp | Val | Asn | Pro | Ser | Gly | Lys | Leu | Thr | Gln | | 645 | 650 | 655 |
| Ser | Phe | Pro | Ala | Ala | Glu | Asn | Gln | His | Ala | Val | Ala | Gly | Asp | Pro | Thr | | 660 | 665 | 670 |
| Ser | Tyr | Pro | Gly | Val | Asp | Asn | Gln | Gln | Thr | Tyr | Arg | Glu | Gly | Ile | His | | 675 | 680 | 685 |
| Val | Gly | Tyr | Arg | Trp | Phe | Asp | Lys | Glu | Asn | Val | Lys | Pro | Leu | Phe | Pro | | 690 | 695 | 700 |
| Phe | Gly | His | Gly | Leu | Ser | Tyr | Thr | Ser | Phe | Thr | Gln | Ser | Ala | Pro | Thr | | 705 | 710 | 715 |
| Val | Val | Arg | Thr | Ser | Thr | Gly | Gly | Leu | Lys | Val | Thr | Val | Thr | Val | Arg | | 725 | 730 | 735 |
| Asn | Ser | Gly | Lys | Arg | Ala | Gly | Gln | Glu | Val | Val | Gln | Ala | Tyr | Leu | Gly | | 740 | 745 | 750 |
| Ala | Ser | Pro | Asn | Val | Thr | Ala | Pro | Gln | Ala | Lys | Lys | Lys | Leu | Val | Gly | | 755 | 760 | 765 |
| Tyr | Thr | Lys | Val | Ser | Leu | Ala | Ala | Gly | Glu | Ala | Lys | Thr | Val | Thr | Val | | 770 | 775 | 780 |
| Asn | Val | Asp | Arg | Arg | Gln | Leu | Gln | Thr | Gly | Ser | Ser | Ser | Ala | Asp | Leu | | 785 | 790 | 795 |
| Arg | Gly | Ser | Ala | Thr | Val | Asn | Val | Trp | | | | | | | | | 805 | | 800 |

<210> 25

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> A synthetic consensus sequence.

<220>
 <221> VARIANT
 <222> (4)...(4)
 <223> Residue 4 is either V or I.

<400> 25
 Leu Leu Asp Val Ala Cys Gly Thr Gly
 1 5

<210> 26
 <211> 1011
 <212> DNA
 <213> Streptomyces venezuelae

<400> 26
 atggcaatgc gcgactccat accgaggcga gcggaaccgcg acacccttcg ccgcaatta 60
 ggccagaact tccttcagga cgacagagcc gtgcgcaatc tcgtcacgca tgtcgagggg 120
 gacggttaga acgttctcga aatcggcccc ggaaagggcg cgataaccga ggagttggtg 180
 cgctccttcg acaccgtgac ggtcgtggag atggaccgcg actggggcgc gcatgtgcgg 240
 cggaaattcg aaggggagag ggtcaccgta ttccaggggtg atttcctcga cttccgcatt 300
 ccgcgcgata tcgacaccgt cgtcggaaac gttcccttcg gcatcacgac ccagattctc 360
 cggagtctcc tggaaatcgac gaactggcag tcggcggccc tgatagtga gtgggaggtc 420
 gcccgc aaac gcgcgggtcg cagcggcgga tcgtcctca cgacctcctg ggccccctgg 480
 tacgagttcg cgggtccacga ccgcgtccgc gctcgtcgt tccgtccgat gccccgcgtc 540
 gacggcggcg tcctgacgat caggcgacgc cccagcccc tgctgcccga gagcgcgagc 600
 cgcgccctcc agaacttcgc cgaagccgtc ttcaccggcc ccggacgggg cctcgcggag 660
 atcctccggc gccacatccc caagcggacc taccgttccc tcgccgaccg ccacggaatt 720
 ccggacggcg gactgccgaa ggacctcacg ctcacccaat ggatcgccct tttccagggc 780
 tcccagccga gttacgcgcc gggggcgccc ggcacgcga tgccggggcca gggcgggtggc 840
 gccggcggca gggactatga ctcggagacg agcagggccg ccgtgcccgg gagccgcaga 900
 tacggcccca cgcgcgggcg cgaaccctgc gcaccccgcg cacaggtccg gcagaccaag 960
 ggccgccagg gcgcgcgagg ctcgtcgtac ggacgccgca cgggccgtta g 1011

<210> 27
 <211> 336
 <212> PRT
 <213> Streptomyces venezuelae

<400> 27
 Met Ala Met Arg Asp Ser Ile Pro Arg Arg Ala Asp Arg Asp Thr Leu
 1 5 10 15
 Arg Arg Glu Leu Gly Gln Asn Phe Leu Gln Asp Asp Arg Ala Val Arg
 20 25 30
 Asn Leu Val Thr His Val Glu Gly Asp Gly Arg Asn Val Leu Glu Ile
 35 40 45
 Gly Pro Gly Lys Gly Ala Ile Thr Glu Glu Leu Val Arg Ser Phe Asp
 50 55 60
 Thr Val Thr Val Val Glu Met Asp Pro His Trp Ala Ala His Val Arg
 65 70 75 80
 Arg Lys Phe Glu Gly Glu Arg Val Thr Val Phe Gln Gly Asp Phe Leu
 85 90 95
 Asp Phe Arg Ile Pro Arg Asp Ile Asp Thr Val Val Gly Asn Val Pro
 100 105 110
 Phe Gly Ile Thr Thr Gln Ile Leu Arg Ser Leu Leu Glu Ser Thr Asn
 115 120 125
 Trp Gln Ser Ala Ala Leu Ile Val Gln Trp Glu Val Ala Arg Lys Arg
 130 135 140
 Ala Gly Arg Ser Gly Gly Ser Leu Leu Thr Thr Ser Trp Ala Pro Trp
 145 150 155 160
 Tyr Glu Phe Ala Val His Asp Arg Val Arg Ala Ser Ser Phe Arg Pro
 165 170 175

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Pro | Arg | Val | Asp | Gly | Gly | Val | Leu | Thr | Ile | Arg | Arg | Arg | Pro | Gln |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Pro | Leu | Leu | Pro | Glu | Ser | Ala | Ser | Arg | Ala | Phe | Gln | Asn | Phe | Ala | Glu |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Ala | Val | Phe | Thr | Gly | Pro | Gly | Arg | Gly | Leu | Ala | Glu | Ile | Leu | Arg | Arg |
| | | 210 | | | | 215 | | | | | 220 | | | | |
| His | Ile | Pro | Lys | Arg | Thr | Tyr | Arg | Ser | Leu | Ala | Asp | Arg | His | Gly | Ile |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Pro | Asp | Gly | Gly | Leu | Pro | Lys | Asp | Leu | Thr | Leu | Thr | Gln | Trp | Ile | Ala |
| | | | 245 | | | | | 250 | | | | | | 255 | |
| Leu | Phe | Gln | Ala | Ser | Gln | Pro | Ser | Tyr | Ala | Pro | Gly | Ala | Pro | Gly | Thr |
| | | 260 | | | | | 265 | | | | | 270 | | | |
| Arg | Met | Pro | Gly | Gln | Gly | Gly | Gly | Ala | Gly | Gly | Arg | Asp | Tyr | Asp | Ser |
| | | 275 | | | | 280 | | | | | | 285 | | | |
| Glu | Thr | Ser | Arg | Ala | Ala | Val | Pro | Gly | Ser | Arg | Arg | Tyr | Gly | Pro | Thr |
| | | 290 | | | | 295 | | | | | 300 | | | | |
| Arg | Gly | Gly | Glu | Pro | Cys | Ala | Pro | Arg | Ala | Gln | Val | Arg | Gln | Thr | Lys |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Gly | Arg | Gln | Gly | Ala | Arg | Gly | Ser | Ser | Tyr | Gly | Arg | Arg | Thr | Gly | Arg |
| | | | 325 | | | | | 330 | | | | | | 335 | |

<210> 28

<211> 969

<212> DNA

<213> Streptomyces venezuelae

<400> 28

| | | | | | | |
|-------------|------------|-------------|------------|-------------|------------|-----|
| atggcatttt | ccccgcaggg | cggccgacac | gagctcggtc | agaacttcct | cgtcgaccgg | 60 |
| tcagtgatcg | acgagatcga | cggcctgggtg | gccaggacca | agggtccgat | actggagatc | 120 |
| ggtcgagggtg | acggcgccct | gaccctgccg | ctgagcaggc | acggcaggcc | gatcaccgcc | 180 |
| gtcgaagtctg | acggccggcg | cgcgcagcgc | ctcggtgccc | gcacccccgg | tcatgtgacc | 240 |
| gtgggtgcacc | acgacttcct | gcagtaccgc | ctgccgcgca | acccgcatgt | ggtcgtcggc | 300 |
| aacgtcccct | tccatctgac | gacggcgatc | atgcggcggc | tgctcgacgc | ccagcactgg | 360 |
| cacaccgccg | tcctcctcgt | ccagtgggag | gtcgcccggc | gccgggcccgg | cgtcggcggg | 420 |
| tcgacgctgc | tgacggccgg | ctgggcgccc | tggtacgagt | tcgacctgca | ctcccgggtc | 480 |
| cccgcgcggg | ccttcctgcc | gatgccgggc | gtggacggag | gagtactggc | catccggcgg | 540 |
| cggtcgcgcg | cgctcgtggg | ccaggtgaag | acgtaccagg | acttcgtacg | ccaggtgttc | 600 |
| accggcaagg | ggaacgggct | gaaggagatc | ctgcggcgga | ccgggaggat | ctcgcagcgg | 660 |
| gacctggcga | cctggctgcg | gaggaacgag | atctcgccgc | acgcgctgcc | caaggacctg | 720 |
| aagcccgggc | agtgggcgtc | gctgtgggag | ctgaccggcg | gcacggccga | cggatccttc | 780 |
| gacgggtacgg | cgggcgggtg | cgcggccgga | tcgcacgggg | cggctcgggt | cggggccggg | 840 |
| cacccgggcg | gccgggtgtc | cgcgagccgg | cggggcggtc | cgcaggcgcg | gcgcggccgg | 900 |
| gggcatgcgg | tacggagctc | cacggggacc | gagccgaggt | ggggcagggg | gcgggcggag | 960 |
| agcgcgtga | | | | | | 969 |

<210> 29

<211> 322

<212> PRT

<213> Streptomyces venezuelae

<400> 29

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Ala | Phe | Ser | Pro | Gln | Gly | Gly | Arg | His | Glu | Leu | Gly | Gln | Asn | Phe |
| 1 | | | | 5 | | | | 10 | | | | | 15 | | |
| Leu | Val | Asp | Arg | Ser | Val | Ile | Asp | Glu | Ile | Asp | Gly | Leu | Val | Ala | Arg |
| | | 20 | | | | | 25 | | | | | 30 | | | |
| Thr | Lys | Gly | Pro | Ile | Leu | Glu | Ile | Gly | Pro | Gly | Asp | Gly | Ala | Leu | Thr |
| | | 35 | | | | 40 | | | | | 45 | | | | |
| Leu | Pro | Leu | Ser | Arg | His | Gly | Arg | Pro | Ile | Thr | Ala | Val | Glu | Leu | Asp |
| | 50 | | | | 55 | | | | | 60 | | | | | |
| Gly | Arg | Arg | Ala | Gln | Arg | Leu | Gly | Ala | Arg | Thr | Pro | Gly | His | Val | Thr |
| 65 | | | | 70 | | | | | 75 | | | | | 80 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Val | His | His | Asp | Phe | Leu | Gln | Tyr | Pro | Leu | Pro | Arg | Asn | Pro | His |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Val | Val | Val | Gly | Asn | Val | Pro | Phe | His | Leu | Thr | Thr | Ala | Ile | Met | Arg |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Arg | Leu | Leu | Asp | Ala | Gln | His | Trp | His | Thr | Ala | Val | Leu | Leu | Val | Gln |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Trp | Glu | Val | Ala | Arg | Arg | Arg | Ala | Gly | Val | Gly | Gly | Ser | Thr | Leu | Leu |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Thr | Ala | Gly | Trp | Ala | Pro | Trp | Tyr | Glu | Phe | Asp | Leu | His | Ser | Arg | Val |
| | 145 | | | | 150 | | | | | 155 | | | | | 160 |
| Pro | Ala | Arg | Ala | Phe | Arg | Pro | Met | Pro | Gly | Val | Asp | Gly | Gly | Val | Leu |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Ala | Ile | Arg | Arg | Arg | Ser | Ala | Pro | Leu | Val | Gly | Gln | Val | Lys | Thr | Tyr |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Gln | Asp | Phe | Val | Arg | Gln | Val | Phe | Thr | Gly | Lys | Gly | Asn | Gly | Leu | Lys |
| | 195 | | | | | | 200 | | | | | 205 | | | |
| Glu | Ile | Leu | Arg | Arg | Thr | Gly | Arg | Ile | Ser | Gln | Arg | Asp | Leu | Ala | Thr |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Trp | Leu | Arg | Arg | Asn | Glu | Ile | Ser | Pro | His | Ala | Leu | Pro | Lys | Asp | Leu |
| | 225 | | | | 230 | | | | | 235 | | | | | 240 |
| Lys | Pro | Gly | Gln | Trp | Ala | Ser | Leu | Trp | Glu | Leu | Thr | Gly | Gly | Thr | Ala |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Asp | Gly | Ser | Phe | Asp | Gly | Thr | Ala | Gly | Gly | Gly | Ala | Ala | Gly | Ser | His |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Gly | Ala | Ala | Arg | Val | Gly | Ala | Gly | His | Pro | Gly | Gly | Arg | Val | Ser | Ala |
| | | 275 | | | | 280 | | | | | | 285 | | | |
| Ser | Arg | Arg | Gly | Val | Pro | Gln | Ala | Arg | Arg | Gly | Arg | Gly | His | Ala | Val |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Arg | Ser | Ser | Thr | Gly | Thr | Glu | Pro | Arg | Trp | Gly | Arg | Gly | Arg | Ala | Glu |
| | 305 | | | | 310 | | | | | 315 | | | | | 320 |
| Ser | Ala | | | | | | | | | | | | | | |

<210> 30

<211> 13842

<212> DNA

<213> Streptomyces venezuelae

<400> 30

| | | | | | | |
|------------|------------|-------------|------------|------------|------------|------|
| atgtcttcag | ccggaattac | caggaccggt | gcgagaacac | cggtgacagg | gcgtggggcg | 60 |
| gcagcgtggg | acacggggga | agtgcgggtc | cgacgggggt | tgccccctgc | cggccccgat | 120 |
| catgcggagc | actccttctc | tcgtgtcctc | accggtgatg | tgcgcgccga | attgattcgt | 180 |
| ggagagatgt | cgacagtgtc | caagagttag | tccgaggaat | tcgtgtccgt | gtcgaacgac | 240 |
| gccggttccg | cgcacggcac | agcggaaacc | gtcgccgtcg | tcggcatctc | ctgccgggtg | 300 |
| cccggcgccc | gggacccgag | agagtctctg | gaactcctgg | cggcaggcgg | ccaggccgtc | 360 |
| accgacgtcc | ccgcggaccg | ctggaacgcc | ggcgacttct | acgaccgcga | ccgctccgcc | 420 |
| cccggccgct | cgaacagccg | gtggggcggg | ttcatcgagg | acgtcgaccg | gttcgacgcc | 480 |
| gccttcttcg | gcatctcgcc | ccgcgaggcc | gcggagatgg | accgcagca | gcggctcgcc | 540 |
| ctggagctgg | gctgggaggg | cctggagcgc | gccgggatcg | accgctcctc | gctcaccggc | 600 |
| accgcaccg | gcgtcttcgc | cggcgccatc | tgggacgact | acgccaccct | gaagcaccgc | 660 |
| cagggcgggc | ccgcgatcac | cccgcacacc | gtcaccggcc | tccaccgcgg | catcatcgcg | 720 |
| aaccgactct | cgtaacagct | cgggctccgc | ggccccagca | tggtcgtcga | ctccggccag | 780 |
| tctcgtcgc | tcgtcgccgt | ccacctcgcg | tgcgagagcc | tgcggcgcgg | cgagtcgag | 840 |
| ctcgccctcg | ccggcgccgt | ctcgctcaac | ctggtgcccg | acagcatcat | cggggcgagc | 900 |
| aagttcggcg | gcctctcccc | cgacggccgc | gcctacacct | tcgacgcgcg | cgccaacggc | 960 |
| tacgtacgcg | gcgaggcgcg | cggtttcgtc | gtcctgaagc | gcctctcccg | ggccgtcgcc | 1020 |
| gacggcgacc | cggtgctcgc | cgtgatccgg | ggcagcgccg | tcaacaacgg | cggcgccgcc | 1080 |
| cagggcatga | cgacccccga | cgcgcaggcg | caggaggccg | tgctccgcga | ggccccagag | 1140 |
| cgggcccggg | ccgcgccggc | cgacgtgcgg | tacgtcgagc | tgacggcac | cggcaccccc | 1200 |
| gtgggcgacc | cgatcgaggc | cgctgcgctc | ggcgccgccc | tcggcaccgg | ccgcccggcc | 1260 |
| ggacagccgc | tcctggtcgg | ctcgggtcaag | acgaacatcg | gccacctgga | gggcgcggcc | 1320 |
| ggcatcgccg | gcctcatcaa | ggccgtcctg | gcggtccgcg | gtcgcgcgct | gcccgccagc | 1380 |

| | | | | | | |
|-------------|-------------|------------|------------|-------------|-------------|------|
| ctgaactacg | agacccccgaa | cccggcgatc | ccgttcgagg | aactgaacct | ccgggtgaac | 1440 |
| acggagtagc | tgccgtggga | gccggagcac | gacgggcagc | ggatgggtcgt | cggcggtgcc | 1500 |
| tcgttcggca | tggggcgccac | gaacgcgcac | gtcgtgctcg | aagaggcccc | cgggggttgt | 1560 |
| cgaggtgctt | cggtcgtgga | gtcgcgggtc | ggcgggtcgg | cggtcggcgg | cgggtgtggtg | 1620 |
| ccgtgggtgg | tgtcggcgaa | gtccgctgcc | gcgctggacg | cgcagatcga | gcggcttgcc | 1680 |
| gcgttcgcct | cgcgggatcg | tacggatggt | gtcgacgcgg | gcgctgtcga | tgcgggtgct | 1740 |
| gtcgatgcgg | gtgctgtcgc | tcgcgtactg | gccggcgggc | gtgctcagtt | cgagcaccgg | 1800 |
| gccgtcgtcg | tcggcagcgg | gccggacgat | ctggcggcag | cgctggccgc | gcctgagggg | 1860 |
| ctggtccggg | gcgtggcttc | cgggtgtcgg | cgagtggcgt | tcgtgttccc | cgggcagggc | 1920 |
| acgcagtggg | ccggcatggg | tgccgaactg | ctggactctt | ccgcggtggt | cgcggcgggc | 1980 |
| atggccgaat | gcgaggccgc | actctccccg | tacgtcgact | ggtcgcgtgga | ggcgcgtcga | 2040 |
| cggcaggccc | cgggtgcgcc | cacgctggag | cgggtcgatg | tcgtgcagcc | tgtgacgttc | 2100 |
| gccgtcatgg | tctcgtggc | tcgcgtgtgg | cagcaccacg | gggtgacgcc | ccaggcgggtc | 2160 |
| gtcggccact | cgcaggcgga | gatcgccggc | gcgtacgtcg | ccggtgccct | gagcctggac | 2220 |
| gacgccgctc | gtgtcgtgac | cctgcgcagc | aagtccatcg | ccgcccacct | cgcgggcaag | 2280 |
| ggcggcatgc | tgtccctcgc | gctgagcgag | gacgccgtcc | tggagcgact | ggcgggttc | 2340 |
| gacgggctgt | ccgtcgccgc | tgtgaacggg | cccaccgcca | ccgtggtctc | cggtgacccc | 2400 |
| gtacagatcg | aagagcttgc | tcgggcgtgt | gaggccgatg | gggtccgtgc | gcgggtcatt | 2460 |
| cccgtcgact | acgcgtccca | cagccggcag | gtcgagatca | tcgagagcga | gctcgccgag | 2520 |
| gtcctcgccg | ggctcagccc | gcaggtccg | cgcggtgccg | tcttctcgac | actcgaaggc | 2580 |
| gcctggatca | ccgtagccgt | gctcgacggc | ggctactggt | accgcaacct | gcgccatcgt | 2640 |
| gtgggcttcg | ccccggccgt | cgagaccctg | gccaccgacg | agggcttcac | ccacttcgtc | 2700 |
| gaggtcagcg | cccaccccg | cctcaccatg | gccctccccg | ggaccgtcac | cggctcggcg | 2760 |
| accctgcgtc | gcgacaacgg | cggtcaggac | cgctagtgcg | cctccctcgc | cgaagcatgg | 2820 |
| gccaacggac | tcgcggtcga | ctggagcccg | ctcctccctt | ccgcgaccgg | ccaccactcc | 2880 |
| gacctcccca | cctacgcggt | ccagaccgag | cgccactggc | tgggcgagat | cgaggcgctc | 2940 |
| gccccggcgg | gcgagccggc | ggtgcagccc | gccgtccctc | gcacggaggc | ggccgagccg | 3000 |
| gcggagctcg | accgggacga | gcagctgcgc | gtgatcctgg | acaagggtccg | ggcgcagacg | 3060 |
| gccaggtgc | tggggtacgc | gacaggcggg | catagtcgag | tcgaccggac | cttcctgtgag | 3120 |
| gcccgttgca | cctccctgac | cggcgtggac | ctgcgcaacc | ggatcaacgc | cgcttcggc | 3180 |
| gtacggatgg | cgccgtccat | gatcttcgac | ttccccaccc | ccgaggctct | cgcgttcgag | 3240 |
| ctgctcctcg | tcgtgcacgg | ggaggcgggc | gcgaaccggg | ccggtgcgga | gccggctccg | 3300 |
| gtggcgccgg | ccggtgccgt | cgacgagccg | gtggcgatcg | tcggcatggc | ctgccgcctg | 3360 |
| cccgggtggg | tcgcctcgcc | ggaggacctg | tggcggtgg | tggccggcgg | cggggacgcg | 3420 |
| atctcggagt | tcggcgagga | ccgcggctgg | gacgtggagg | ggctgtacca | cccggatccg | 3480 |
| gagcaccctg | gcacgtcgta | cgtccgccag | ggcggtttca | tcgagaacgt | cgcgggttc | 3540 |
| gacgcggcct | tcttcgggat | ctgcgcgcgc | gaggccctcg | ccatggaccc | gcagcagcgg | 3600 |
| ctcctctcgc | aaacctcctg | ggaggccgtc | gaggacgcgc | ggatcgaccc | gacctccctg | 3660 |
| cggggacggc | aggtcggcgt | cttactggg | gcgatgaccc | acgagtacgg | gccgagcctg | 3720 |
| cgggacggcg | gggaaggcct | cgacggctac | ctgctgaccg | gcaacacggc | cagcgtgatg | 3780 |
| tcggggccgcg | tctcgtacac | actcggcctt | gagggccccc | ccctgacggg | ggacacggcc | 3840 |
| tgctcgtcgt | cgctggtcgc | cctgcacctc | gccgtgcagg | ccctgcgcaa | gggcgaggtc | 3900 |
| gacatggcgc | tcgcggcgcg | cgtggccgtg | atgccacgc | ccgggatggt | cgtcgagttc | 3960 |
| agccggcagc | gcgggctggc | cggggacggc | cggtcgaagg | cgttcgccgc | gtcggcgagc | 4020 |
| ggcaccagct | ggtccgaggg | cgtcggcgct | ctcctcgtcg | agcgcctgtc | ggacgcccgc | 4080 |
| cgcaacggac | accaggtcct | cgcggtcgtc | cgcggcagcg | ccttgaacca | ggacggcgcg | 4140 |
| agcaacggcc | tcacgggtcc | gaacggggcc | tcgcagcagc | gcgtcatccg | gcgcgcgtg | 4200 |
| gcggacgccc | ggctgacgac | ctccgacgtg | gacgtcgtcg | aggcacacgg | cacgggcacg | 4260 |
| cgactcggcg | acccgatcga | ggcgcaggcc | ctgatcgcca | cctacggcca | gggccgtgac | 4320 |
| gacgaacagc | cgctgcgcct | cgggtcgttg | aagtccaaca | tcgggcacac | ccaggccgcg | 4380 |
| gccggcgtct | ccggtgtcat | caagatgggt | caggcgatgc | gccacggact | gctgccgaag | 4440 |
| acgctgcacg | tcgacgagcc | ctcggaccag | atcgactggt | cggctggcgc | cgtggaactc | 4500 |
| ctcaccgagg | ccgtcgactg | gccggagaag | caggacggcg | ggctgcgccc | ggccgccgtc | 4560 |
| tcctccttcg | ggatcagcgg | caccaatgcg | catgtggtgc | tcgaagaggc | cccgggtggt | 4620 |
| gtcgaggggt | cttcggtcgt | cgagccgctg | gttgccgggt | cggcggtcgg | cggcggtgtg | 4680 |
| acgccttggg | tgggtgcggt | gaagtccgct | gccgcgctcg | acgcgcagat | cgagcggctt | 4740 |
| gccgcattcg | cctcgcggga | tcgtacggat | gacgccgacg | ccggtgctgt | cgacgcgggc | 4800 |
| gctgtcgctc | acgtactggc | tgacgggcgt | gctcagttcg | agcaccgggc | cgtcgcgctc | 4860 |
| ggcggccggg | cggacgacct | cgtacaggcg | ctggccgatc | cggacgggct | gatacgcgga | 4920 |
| acggcttccg | gtgtcgggcg | agtggcggtt | gtgttccccg | gtcagggcac | gcagtgggct | 4980 |
| ggcatgggtg | ccgaactgct | ggactcttcc | gcggtgttcg | cggcgggcat | ggccgagtgt | 5040 |
| gaggccgcgc | tgtccccgta | cgtcgactgg | tcgctggagg | ccgtcgtacg | gcaggccccc | 5100 |

| | | | | | | |
|------------|-------------|------------|-------------|-------------|-------------|------|
| ggtgcgcccc | cgctggagcg | ggtcgatgtc | gtgcagcctg | tgacgttcgc | cgatcatggtc | 5160 |
| tcgctgggtc | gcgtgtggca | gcaccacggt | gtgacgcccc | aggcgggtcgt | cgggccactcg | 5220 |
| cagggcgaga | tcgcccgcgc | gtacgtcgcc | ggagccctgc | ccctggacga | cgccgcccgc | 5280 |
| gtcgtcacc | tgcgcagcaa | gtccatcgcc | gcccactcgt | ccggcaaggg | cgccatgctg | 5340 |
| tccctcgcg | tgaacgagga | cgccgtcctg | gagcgactga | gtgacttcga | cgggctgtcc | 5400 |
| gtcgccgcgc | tcaacgggccc | caccgccact | gtcgtgtcgg | gtgaccccg | acagatcgaa | 5460 |
| gagcttgctc | aggcgtgcaa | ggcggacgga | ttccgcgcgc | ggatcattcc | cgtcgactac | 5520 |
| gcgtcccaca | gccggcaggt | cgagatcatc | gagagcgagc | tcgcccaggt | cctcgccggt | 5580 |
| ctcagcccgc | aggccccgcg | cgtgccgttc | ttctcgacgc | tcgaaggcac | ctggatcacc | 5640 |
| gagcccgtcc | tcgacggcac | ctactggtac | cgcaacctcc | gtcaccgcgt | cggttcgcgc | 5700 |
| cccgccatcg | agacctggg | cgtcgacgag | ggcttcacgc | acttcgtcga | ggtcagcgcc | 5760 |
| caccccgctc | tcaccatgac | cctccccgag | accgtcaccg | gcctcggcac | cctccgtcgc | 5820 |
| gaacagggag | gccaagagcg | tctggtcacc | tcgctcgccg | aggcgtgggt | caacgggctt | 5880 |
| cccgtggcat | ggacttcgct | cctgcccgc | acggcctccc | gccccggtct | gcccactac | 5940 |
| gccttcagg | ccgagcgcta | ctggctcgag | aacactccc | ccgccctggc | caccggcgac | 6000 |
| gactggcgct | accgcatcga | ctggaagcgc | ctccggcgcc | ccgaggggtc | cgagcgcacc | 6060 |
| ggcctgtccg | gccgctgggt | cgccgtcacg | ccggaggacc | actccgcgca | ggccgcgcgc | 6120 |
| gtgctcaccg | cgctggctga | cgccggggcg | aaggctcgagg | tgctgacggc | cggggcggac | 6180 |
| gacgaccgtg | aggccctcgc | cgcccggctc | accgactga | cgaccggtga | cggttcacc | 6240 |
| ggcgtgggtc | cgtcctcga | cggactcgta | ccgcaggctg | cctgggtcca | ggcgctcggc | 6300 |
| catcgccgaa | tcaaggcgcc | cctgtggctc | gtcaccaggt | gcgcgggtctc | cgtcggacgt | 6360 |
| gtcgacaccc | ccgcgcaccc | cgaccgggcc | atgctctggg | gcctcggccg | cgtcgtcgcc | 6420 |
| cttgagcacc | ccgaacgctg | ggccggcctc | gtcgacctcc | ccgcccagcc | cgatgccgcc | 6480 |
| gccctcgccc | acctcgtcac | cgcactctcc | ggcgccaccg | gcgaggacca | gatcgccatc | 6540 |
| cgcaccaccg | gactccacgc | ccgccgcctc | gcccgcgcac | ccctccacgg | acgtcggccc | 6600 |
| acccgcgact | ggcagcccca | cggcaccgtc | ctcatcaccg | gcggcaccgg | agccctcggc | 6660 |
| agccacgcgc | cacgctggat | ggcccaccac | ggagccgaac | acctcctcct | cgtcagccgc | 6720 |
| agcggcgaac | aagcccccg | agccacccaa | ctcaccgccg | aactcaccgc | atcgggcgcc | 6780 |
| cgcgtcacca | tcgcgcctg | cgacgtcgcc | gacccccacg | ccatgcgcac | cctcctcgac | 6840 |
| ggcatccccg | ccgagcgcc | cctcaccgcc | gtcgtccaca | ccgcccgcgc | gctcgacgac | 6900 |
| ggcatcgtgg | acacgctgac | cgccgagcag | gtccggcggg | cccaccgtgc | gaaggccgtc | 6960 |
| ggcgctcgg | tgctcgacga | gctgaccggg | gacctcgacc | tcgacgcgtt | cgtgctcttc | 7020 |
| tcgtccgtgt | cgagcactct | gggcatcccc | ggtcagggca | actacgcccc | gcacaacgcc | 7080 |
| tacctcgacg | ccctcgcggc | tcgccgcggg | gccaccggcc | ggtccgcctg | ctcggtggcc | 7140 |
| tggggaccgt | gggacggtgg | cggcatggcc | gccggtgacg | gcgtggccga | gcggctgcgc | 7200 |
| aaccacggcg | tgccccgcat | ggaccgggaa | ctcgccctgg | ccgactgga | gtccgcgctc | 7260 |
| ggccgggacg | agaccgcgat | caccgtcgcg | gacatcgact | gggaccgctt | ctacctcgcg | 7320 |
| tactcctccg | gtcgcccga | gcccctcgte | gaggagctgc | ccgaggtgcg | gcgcatactc | 7380 |
| gacgcacggg | gtccggacac | gtccggacag | ggcggagct | ccgcccaggg | cgccaacccc | 7440 |
| ctggccgagc | ggctggccgc | cgcggtccc | ggcgagcgta | cggagatcct | cctcggtctc | 7500 |
| gtacgggcgc | aggccgccc | cgtgctccgg | atgcgttcgc | cggaggacgt | cgccgcgcac | 7560 |
| cgcgccttca | aggacatcgg | cttcgactcg | ctcgccgggtg | tcgagctgcg | caacaggctg | 7620 |
| acccgggcca | ccggggtcca | gctgcccgcg | acgctcgtct | tcgaccaccc | gacgcgcgtg | 7680 |
| gccctcgtgt | cgctgctccg | cagcgagttc | ctcggtgacg | aggagacggc | ggacgcccgg | 7740 |
| cggtcgcgcg | cgctgcccgc | gactgtcgg | gccggtgcgc | gcgcgcggcg | cggcaccgat | 7800 |
| gccgacgacg | atccgatcgc | gatcgtcgcg | atgagctgcc | gctaccccgg | tgacatccgc | 7860 |
| agcccggagg | acctgtggcg | gatgctgtcc | gagggcggcg | agggcatac | gccgttcccc | 7920 |
| accgaccgcg | gctgggacct | cgacggcctg | tacgacgcgc | acccggacgc | gctcggcagg | 7980 |
| gcgtacgtcc | gcgagggcgg | gttctctcac | gacgcggccg | agttcgacgc | ggagttcttc | 8040 |
| ggcgtctcgc | cgcgcgaggc | gctggccatg | gacccgcagc | agcggatgct | cctgacgacg | 8100 |
| tcctgggagg | ccttcgagcg | ggccggcatc | gagccggcat | cgtcgcgcgg | cagcagcacc | 8160 |
| ggtgtcttca | tcggcctctc | ctaccaggac | tacgcggccc | gcgtcccga | cgccccgcgt | 8220 |
| ggcgtggagg | gttacctgct | gaccggcagc | acgccgagcg | tcgctcggg | ccgtatcgcg | 8280 |
| tacaccttcg | gtctcgaagg | gcccgcgacg | accgtcgaca | ccgctgctc | gtcgtcgctg | 8340 |
| accgccttcg | acctggcggt | gcgggcgctg | cgcagcggcg | agtgcacgat | ggcgtcgcgc | 8400 |
| ggtggcggtg | cgatgatggc | gacccgcgat | atgttcgtgg | agttcagccg | tcagcggggc | 8460 |
| ctcgcccccg | acggccgcag | caaggccttc | tcggcgagcg | ccgacgggtt | cgccgcgcgc | 8520 |
| gagggcgctg | gcctgctgct | cgtggagcgg | ctctcggacg | cgcggcgcaa | cggtcacccg | 8580 |
| gtgctcgccg | tggtccgcgg | taccgccgtc | aaccaggacg | gcgccagcaa | cgggctgacc | 8640 |
| gcgcccacac | gacctcgcga | gcagcgggtg | atccggcagg | cgctcgccga | cgcccggtcg | 8700 |
| gcacccggcg | acatcgacgc | cgtcgagacg | cacggcacgg | gaacctcgct | gggcgacccc | 8760 |
| atcgaggccc | agggcctcca | ggccacgtac | ggcaaggagc | ggcccgcgga | acggccgctc | 8820 |

| | | | | | | |
|------------|-------------|-------------|-------------|-------------|-------------|-------|
| gccatcggct | ccgtgaagtc | caacatcggg | cacacccagg | ccgcggcccg | tgccggcgcc | 8880 |
| atcatcaaga | tggtcctcgc | gatgcgccac | ggcaccctgc | cgaagaccct | ccacgccgac | 8940 |
| gagccgagcc | cgcacgtcga | ctgggcgaac | agcggcctgg | ccctcgtcac | cgagccgac | 9000 |
| gactggcccg | ccggcaccgc | tccgcgcgcg | gccgcgctct | cctccttcgg | catcagcgcc | 9060 |
| acgaacgcgc | acgtcgtgct | ggagcaggcg | ccgatgctg | ctggtgaggt | gcttggggcc | 9120 |
| gatgaggtgc | ctgaggtgtc | tgagacggta | gcgatggctg | ggacggctgg | gacctccgag | 9180 |
| gtcgtgagg | gctctgaggg | ctccgagggc | cccgcggccc | ccggcagccg | tgaggcgctc | 9240 |
| ctccccgggc | acctgccctg | ggtgctgtcc | gccaaggacg | agcagtcgct | gcgcggccag | 9300 |
| gccgccgccc | tgacacgcgtg | gctgtccgag | cccgcgcgcg | acctgtcggg | cgcgagcggg | 9360 |
| ccggcccgcc | tgccgggacgt | cgggtacacg | ctcgccacga | gccgtaccgc | cttcgcgcac | 9420 |
| cgccgcggcg | tgaccggccgc | cgaccggggg | gggttctctg | acgggctggc | cacgctggcc | 9480 |
| cagggcgcca | cctcggccca | cgtccacctg | gacaccgccc | gggacggcac | caccgcgttc | 9540 |
| ctcttcaccg | gccagggcag | tcagcgcccc | ggcgccggcc | gtgagctgta | cgaccggcac | 9600 |
| cccgtcttcg | cccggggcgt | cgacgagatc | tgcccccacc | tcgacgggtc | cctcgaactg | 9660 |
| cccctgctcg | acgtgatgtt | cgcgcccgag | ggcagcgccg | aggccgcgct | gctcgacgag | 9720 |
| acgcggtaca | cgcagtgcgc | gctgttcgcc | ctggaggtcg | cgctcttcgg | gctcgctcag | 9780 |
| agctggggca | tgccggccggc | cgcactgctc | ggtcactcgg | tcggcgagat | cgccgcgcgc | 9840 |
| cacgtcgccg | gtgtgttctc | gctcgccgac | gccgcccgcc | tggtcgccgc | gcgcggccgg | 9900 |
| ctcatgcagg | agctgcccgc | cgggtggcgcg | atgctcgccg | tccaggccgc | ggaggacgag | 9960 |
| atccgcgtgt | ggctggagac | ggaggagcgg | tacgcgggac | gtctggacgt | cgccgcgctc | 10020 |
| aacggccccc | aggccgcgct | cctgtccggc | gacgcggacg | cggcgcgggg | ggcggaggcg | 10080 |
| tactggtccg | ggctcgcccg | caggaccgcg | tcagccacgc | cttccactcc | cttccactcc | 10140 |
| gcgcacatgg | acggcgtgct | cgacgggttc | cgcgccgtcc | tgagacgggt | ggagtccggg | 10200 |
| cgccccctcc | tgaccgtggt | ctcgaacgtc | accggcctgg | ccgccggccc | ggacgacctg | 10260 |
| tgccaccccg | agtactgggt | ccggcacgtc | cgcgccaccg | tccgcttcct | cgacggcgctc | 10320 |
| cgtgtcctgc | gcgacctcgg | cgtgcggacc | tgccctggagc | tgggcccccga | cggggtcctc | 10380 |
| accgccatgg | cggccgacgg | cctcgcgggc | acccccgcgg | attccgctgc | cggtcccccc | 10440 |
| gtcggctctc | ccgccggctc | tcccgccgac | tccgccgcgc | gcgcgctccg | gccccggccg | 10500 |
| ctgctcgtgg | cgctgctcgc | ccgcaagcgg | tcggagaccg | agaccgtcgc | ggacgccttc | 10560 |
| ggcagggcgc | cgctgccacg | caccggaccc | gactggcagc | cctggttcgc | cggctccggg | 10620 |
| gcgcaccgcg | tggaacctgc | cacgtactcc | ttccggcgcg | accgctactg | gctggacgcc | 10680 |
| ccggcgggcc | acaccgcggt | ggacaccgcc | ggcctcggtc | tcggcacccg | cgaccaccgc | 10740 |
| ctgctcggcg | ccgtgggtcag | ccttccggac | cgggacggcc | tgctgctcac | cgccgccttc | 10800 |
| tccctgcgca | cccaccctg | gctcgcgggc | cacgccgtcc | tggggagcgt | cctgctcccc | 10860 |
| ggcgcccgca | tggtcgaact | cgccgcgcac | gctgcggagt | ccgccggtct | gcgtgacgtg | 10920 |
| cgggagctga | ccctccttga | accgctggta | ctgcccagac | acggtggcgt | cgagctgcgc | 10980 |
| gtgacggctg | gggcgcggcg | cggagagccc | ggtggcgagt | cggccggggg | cggcgcacgg | 11040 |
| cccgtctccc | tccactcgcg | gctcgccgac | gcgcgcggcg | gtaccgcctg | gtcctgccac | 11100 |
| gcgaccggct | tgctggccac | cgaccggccc | gagcttcacc | tcgcgcggcg | cgtgctggcc | 11160 |
| atgtggccgc | cgcagggcgc | cgaggaggtg | ccgctcgacg | gtctctacga | gcggtcgcac | 11220 |
| gggaacggcc | tcgccttcgg | tccgctgttc | caggggctga | acgcggtgtg | gcggtacgag | 11280 |
| ggtgaggtct | tcgcccacat | cgcgtcccc | gccaccacga | atgcgaccgc | gcccgcgacc | 11340 |
| gcgaacggcg | gcgggagtg | ggcggcggcc | ccctacggca | tccaccccg | cctgctcgac | 11400 |
| gcttcgctgc | acgccatcgc | ggtcggcggt | ctcgtcgacg | agcccagcgt | cgtccgcgtc | 11460 |
| cccttccact | ggagcgggtg | caccgtgcac | gcggccgggt | ccgcggcgcc | ccgggtccgt | 11520 |
| ctcgctccg | cggggacgga | cgcctgtcgc | ctgtccctga | cggacggcga | gggacggccg | 11580 |
| ctggtctccg | tggaacggct | cacgtgcgc | ccggtcaccg | ccgatcaggc | ggcggcgagc | 11640 |
| cgcgtcggcg | ggctgatgca | ccgggtggcc | tggcgtccgt | acgccctcgc | ctcgtccggc | 11700 |
| gaacaggacc | cgcacgccac | ttcgtacggg | ccgaccgcgc | tcctcgga | ggacgagctg | 11760 |
| aaggtcgccg | ccgccctgga | gtccgcgggc | gtcgaagtcg | ggctctaccc | cgacctggcc | 11820 |
| gcgctgtccc | aggacgtggc | ggccggcgcc | ccggcgcccc | gtaccgtcct | tgccgcgctg | 11880 |
| cccgcgggtc | ccgccgacgg | cggcgcgagg | ggtgtacggg | gcacggtggc | ccggacgctg | 11940 |
| gagctgctcc | aggcctggct | ggccgacgag | cacctcgccg | gcacccgcct | gctcctgggt | 12000 |
| acccgcgggt | cgggtgcggga | ccccgagggg | tccggcgccg | acgatggcgg | cgaggacctg | 12060 |
| tcgcacggcg | ccgcctgggg | tctcgtacgg | accgcgcaga | ccgagaaccc | cggccgcttc | 12120 |
| ggccttctcg | acctggccga | cgacgcctcg | ctgtaccgga | ccctgcgctc | ggtgctctcc | 12180 |
| gacgcggggc | tgccgcgacga | accgcagctc | gccctgcacg | acggcaccat | caggctggcc | 12240 |
| cgcttgccct | ccgtccggcc | cgagaccggc | accgcgcac | cggcgctcgc | ccgggagggc | 12300 |
| acggtcctgc | tgaccggcg | caccggcgcc | ctgggcggac | tggtcgcccg | gcacgtgggt | 12360 |
| ggcgagtggg | gcgtacgacg | cctgctgctg | gtgagccggc | ggggcacgga | cgccccgggc | 12420 |
| gccgacgagc | tcgtgcacga | gctggaggcc | ctgggagccg | acgtctcggt | ggccgcgtgc | 12480 |
| gacgtcgccg | accgcgaagc | cctcaccgcc | gtactcgacg | ccatccccgc | cgaacaccgc | 12540 |

| | | | | | | |
|------------|------------|------------|-------------|------------|-------------|-------|
| ctcaccgcgg | tcgtccacac | ggcaggcgtc | ctctccgacg | gcaccctccc | gtccatgacg | 12600 |
| acggaggacg | tggaacacgt | actgcggccc | aaggctcgacg | ccgcgttcct | cctcgacgaa | 12660 |
| ctcacctcga | cgcccccata | cgacctggca | gcgttcgtca | tgtttctctc | cgccgccgcc | 12720 |
| gtcttcggtg | gcgcggggca | gggcgcctac | gccgcgcgca | acgccaccct | cgacgccttc | 12780 |
| gcctggcgcc | gccgggcagc | cggactcccc | gccctctccc | tcggctgggg | cctctgggcc | 12840 |
| gagaccagcg | gcatgaccgg | cgagctcggc | caggcggacc | tgcgcgggat | gagccgcgcg | 12900 |
| ggcatcggcg | ggatcagcga | cgccgagggc | atcgcgctcc | tcgacgccgc | cctccgcgac | 12960 |
| gaccgccacc | cggtcctgct | gcccctgcgg | ctcgacgccg | ccgggctgcg | ggacgcggcc | 13020 |
| gggaacgacc | cggccggaat | cccggcgctc | ttccgggacg | tcgtcggcgc | caggaccgtc | 13080 |
| cgggcccggc | cgtccgcggc | ctccgcctcg | acgacagccg | ggacggccgg | cacgccgggg | 13140 |
| acggcggacg | gcgcggcgga | aacggcgggc | gtcacgctcg | ccgaccgggc | cgccaccgtg | 13200 |
| gacgggcccg | cacggcagcg | cctgctgctc | gagttcgtcg | tcggcgaggt | cgccgaagta | 13260 |
| ctcggccacg | ccgcgggtca | ccggatcgac | gccgaacggg | gcttcctcga | cctcggcttc | 13320 |
| gactccctga | ccgccgtcga | actccgcaac | cggctcaact | ccgccgggtg | cctcgccctc | 13380 |
| ccggcgaccc | tggctctcga | ccaccgaagc | ccggcggcac | tcgcctccca | cctggacgcc | 13440 |
| gagctgccgc | gcggcgcttc | ggaccaggac | ggagccggga | accggaacgg | gaacgagaac | 13500 |
| gggacgacgg | cgtcccggag | caccgccgag | acggacgcgc | tgctggcaca | actgaccgcg | 13560 |
| ctggaaggcg | ccttggtgct | gacgggcctc | tcggacgccc | ccgggagcga | agaagtccctg | 13620 |
| gagcacctgc | ggtccctgcg | ctcgatggtc | acgggcgaga | ccgggaccgg | gaccgcgtcc | 13680 |
| ggagccccgg | acggcgccgg | gtccggcgcc | gaggaccggc | cctgggcggc | cggggacgga | 13740 |
| gccggggcg | ggagtgagga | cggcgcgga | gtgccggact | tcatgaacgc | ctcggccgag | 13800 |
| gaactcttcg | gcctcctcga | ccaggacccc | agcacggact | ga | | 13842 |

<210> 31

<211> 4613

<212> PRT

<213> Streptomyces venezuelae

<400> 31

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Ser | Ser | Ala | Gly | Ile | Thr | Arg | Thr | Gly | Ala | Arg | Thr | Pro | Val | Thr |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Gly | Arg | Gly | Ala | Ala | Ala | Trp | Asp | Thr | Gly | Glu | Val | Arg | Val | Arg | Arg |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Gly | Leu | Pro | Pro | Ala | Gly | Pro | Asp | His | Ala | Glu | His | Ser | Phe | Ser | Arg |
| | | 35 | | | | 40 | | | | | | 45 | | | |
| Ala | Pro | Thr | Gly | Asp | Val | Arg | Ala | Glu | Leu | Ile | Arg | Gly | Glu | Met | Ser |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Thr | Val | Ser | Lys | Ser | Glu | Ser | Glu | Glu | Phe | Val | Ser | Val | Ser | Asn | Asp |
| 65 | | | | 70 | | | | | 75 | | | | | 80 | |
| Ala | Gly | Ser | Ala | His | Gly | Thr | Ala | Glu | Pro | Val | Ala | Val | Val | Gly | Ile |
| | | | 85 | | | | | 90 | | | | | | 95 | |
| Ser | Cys | Arg | Val | Pro | Gly | Ala | Arg | Asp | Pro | Arg | Glu | Phe | Trp | Glu | Leu |
| | | 100 | | | | | | 105 | | | | | 110 | | |
| Leu | Ala | Ala | Gly | Gly | Gln | Ala | Val | Thr | Asp | Val | Pro | Ala | Asp | Arg | Trp |
| | | 115 | | | | | | 120 | | | | | 125 | | |
| Asn | Ala | Gly | Asp | Phe | Tyr | Asp | Pro | Asp | Arg | Ser | Ala | Pro | Gly | Arg | Ser |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Asn | Ser | Arg | Trp | Gly | Gly | Phe | Ile | Glu | Asp | Val | Asp | Arg | Phe | Asp | Ala |
| 145 | | | | 150 | | | | | 155 | | | | | 160 | |
| Ala | Phe | Phe | Gly | Ile | Ser | Pro | Arg | Glu | Ala | Ala | Glu | Met | Asp | Pro | Gln |
| | | | 165 | | | | | 170 | | | | | | 175 | |
| Gln | Arg | Leu | Ala | Leu | Glu | Leu | Gly | Trp | Glu | Ala | Leu | Glu | Arg | Ala | Gly |
| | | 180 | | | | | | 185 | | | | | 190 | | |
| Ile | Asp | Pro | Ser | Ser | Leu | Thr | Gly | Thr | Arg | Thr | Gly | Val | Phe | Ala | Gly |
| | 195 | | | | | 200 | | | | | | 205 | | | |
| Ala | Ile | Trp | Asp | Asp | Tyr | Ala | Thr | Leu | Lys | His | Arg | Gln | Gly | Gly | Ala |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Ala | Ile | Thr | Pro | His | Thr | Val | Thr | Gly | Leu | His | Arg | Gly | Ile | Ile | Ala |
| 225 | | | | | 230 | | | | 235 | | | | | 240 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asn | Arg | Leu | Ser | Tyr | Thr | Leu | Gly | Leu | Arg | Gly | Pro | Ser | Met | Val | Val |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Asp | Ser | Gly | Gln | Ser | Ser | Ser | Leu | Val | Ala | Val | His | Leu | Ala | Cys | Glu |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Ser | Leu | Arg | Arg | Gly | Glu | Ser | Glu | Leu | Ala | Leu | Ala | Gly | Gly | Val | Ser |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Leu | Asn | Leu | Val | Pro | Asp | Ser | Ile | Ile | Gly | Ala | Ser | Lys | Phe | Gly | Gly |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Leu | Ser | Pro | Asp | Gly | Arg | Ala | Tyr | Thr | Phe | Asp | Ala | Arg | Ala | Asn | Gly |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Tyr | Val | Arg | Gly | Glu | Gly | Gly | Gly | Phe | Val | Val | Leu | Lys | Arg | Leu | Ser |
| | | | | 325 | | | | | 330 | | | | | | 335 |
| Arg | Ala | Val | Ala | Asp | Gly | Asp | Pro | Val | Leu | Ala | Val | Ile | Arg | Gly | Ser |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Ala | Val | Asn | Asn | Gly | Gly | Ala | Ala | Gln | Gly | Met | Thr | Thr | Pro | Asp | Ala |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Gln | Ala | Gln | Glu | Ala | Val | Leu | Arg | Glu | Ala | His | Glu | Arg | Ala | Gly | Thr |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| Ala | Pro | Ala | Asp | Val | Arg | Tyr | Val | Glu | Leu | His | Gly | Thr | Gly | Thr | Pro |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Val | Gly | Asp | Pro | Ile | Glu | Ala | Ala | Ala | Leu | Gly | Ala | Ala | Leu | Gly | Thr |
| | | | | 405 | | | | | 410 | | | | | 415 | |
| Gly | Arg | Pro | Ala | Gly | Gln | Pro | Leu | Leu | Val | Gly | Ser | Val | Lys | Thr | Asn |
| | | | 420 | | | | 425 | | | | | | 430 | | |
| Ile | Gly | His | Leu | Glu | Gly | Ala | Ala | Gly | Ile | Ala | Gly | Leu | Ile | Lys | Ala |
| | | 435 | | | | 440 | | | | | | 445 | | | |
| Val | Leu | Ala | Val | Arg | Gly | Arg | Ala | Leu | Pro | Ala | Ser | Leu | Asn | Tyr | Glu |
| | 450 | | | | | 455 | | | | | 460 | | | | |
| Thr | Pro | Asn | Pro | Ala | Ile | Pro | Phe | Glu | Glu | Leu | Asn | Leu | Arg | Val | Asn |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 |
| Thr | Glu | Tyr | Leu | Pro | Trp | Glu | Pro | Glu | His | Asp | Gly | Gln | Arg | Met | Val |
| | | | | 485 | | | | | 490 | | | | | 495 | |
| Val | Gly | Val | Ser | Ser | Phe | Gly | Met | Gly | Gly | Thr | Asn | Ala | His | Val | Val |
| | | | 500 | | | | | 505 | | | | | 510 | | |
| Leu | Glu | Glu | Ala | Pro | Gly | Gly | Cys | Arg | Gly | Ala | Ser | Val | Val | Glu | Ser |
| | | 515 | | | | | 520 | | | | | 525 | | | |
| Thr | Val | Gly | Gly | Ser | Ala | Val | Gly | Gly | Gly | Val | Val | Pro | Trp | Val | Val |
| | 530 | | | | | 535 | | | | | | 540 | | | |
| Ser | Ala | Lys | Ser | Ala | Ala | Ala | Leu | Asp | Ala | Gln | Ile | Glu | Arg | Leu | Ala |
| 545 | | | | | 550 | | | | | 555 | | | | | 560 |
| Ala | Phe | Ala | Ser | Arg | Asp | Arg | Thr | Asp | Gly | Val | Asp | Ala | Gly | Ala | Val |
| | | | | 565 | | | | | 570 | | | | | 575 | |
| Asp | Ala | Gly | Ala | Val | Asp | Ala | Gly | Ala | Val | Ala | Arg | Val | Leu | Ala | Gly |
| | | | 580 | | | | | 585 | | | | | 590 | | |
| Gly | Arg | Ala | Gln | Phe | Glu | His | Arg | Ala | Val | Val | Val | Gly | Ser | Gly | Pro |
| | | 595 | | | | | 600 | | | | | 605 | | | |
| Asp | Asp | Leu | Ala | Ala | Ala | Leu | Ala | Ala | Pro | Glu | Gly | Leu | Val | Arg | Gly |
| | 610 | | | | | 615 | | | | | 620 | | | | |
| Val | Ala | Ser | Gly | Val | Gly | Arg | Val | Ala | Phe | Val | Phe | Pro | Gly | Gln | Gly |
| 625 | | | | | 630 | | | | | 635 | | | | | 640 |
| Thr | Gln | Trp | Ala | Gly | Met | Gly | Ala | Glu | Leu | Leu | Asp | Ser | Ser | Ala | Val |
| | | | | 645 | | | | | 650 | | | | | 655 | |
| Phe | Ala | Ala | Ala | Met | Ala | Glu | Cys | Glu | Ala | Ala | Leu | Ser | Pro | Tyr | Val |
| | | | 660 | | | | | 665 | | | | | 670 | | |
| Asp | Trp | Ser | Leu | Glu | Ala | Val | Val | Arg | Gln | Ala | Pro | Gly | Ala | Pro | Thr |
| | | 675 | | | | | 680 | | | | | 685 | | | |
| Leu | Glu | Arg | Val | Asp | Val | Val | Gln | Pro | Val | Thr | Phe | Ala | Val | Met | Val |
| | 690 | | | | | 695 | | | | | 700 | | | | |
| Ser | Leu | Ala | Arg | Val | Trp | Gln | His | His | Gly | Val | Thr | Pro | Gln | Ala | Val |
| 705 | | | | | 710 | | | | | 715 | | | | | 720 |
| Val | Gly | His | Ser | Gln | Gly | Glu | Ile | Ala | Ala | Tyr | Val | Ala | Gly | Ala | |
| | | | | 725 | | | | | 730 | | | | | 735 | |

| | | | | | | | | | | | | | | | |
|------|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Leu | Ser | Leu | Asp | Asp | Ala | Ala | Arg | Val | Val | Thr | Leu | Arg | Ser | Lys | Ser |
| | | | 740 | | | | | 745 | | | | | 750 | | |
| Ile | Ala | Ala | His | Leu | Ala | Gly | Lys | Gly | Gly | Met | Leu | Ser | Leu | Ala | Leu |
| | | | 755 | | | | 760 | | | | | 765 | | | |
| Ser | Glu | Asp | Ala | Val | Leu | Glu | Arg | Leu | Ala | Gly | Phe | Asp | Gly | Leu | Ser |
| | | | 770 | | | 775 | | | | | 780 | | | | |
| Val | Ala | Ala | Val | Asn | Gly | Pro | Thr | Ala | Thr | Val | Val | Ser | Gly | Asp | Pro |
| 785 | | | | | 790 | | | | | 795 | | | | | 800 |
| Val | Gln | Ile | Glu | Glu | Leu | Ala | Arg | Ala | Cys | Glu | Ala | Asp | Gly | Val | Arg |
| | | | | 805 | | | | | 810 | | | | | 815 | |
| Ala | Arg | Val | Ile | Pro | Val | Asp | Tyr | Ala | Ser | His | Ser | Arg | Gln | Val | Glu |
| | | | 820 | | | | | 825 | | | | | 830 | | |
| Ile | Ile | Glu | Ser | Glu | Leu | Ala | Glu | Val | Leu | Ala | Gly | Leu | Ser | Pro | Gln |
| | | | 835 | | | | 840 | | | | | 845 | | | |
| Ala | Pro | Arg | Val | Pro | Phe | Phe | Ser | Thr | Leu | Glu | Gly | Ala | Trp | Ile | Thr |
| | | | 850 | | | 855 | | | | | 860 | | | | |
| Glu | Pro | Val | Leu | Asp | Gly | Gly | Tyr | Trp | Tyr | Arg | Asn | Leu | Arg | His | Arg |
| 865 | | | | | 870 | | | | | 875 | | | | | 880 |
| Val | Gly | Phe | Ala | Pro | Ala | Val | Glu | Thr | Leu | Ala | Thr | Asp | Glu | Gly | Phe |
| | | | | 885 | | | | | 890 | | | | | 895 | |
| Thr | His | Phe | Val | Glu | Val | Ser | Ala | His | Pro | Val | Leu | Thr | Met | Ala | Leu |
| | | | 900 | | | | | 905 | | | | | 910 | | |
| Pro | Gly | Thr | Val | Thr | Gly | Leu | Ala | Thr | Leu | Arg | Arg | Asp | Asn | Gly | Gly |
| | | | 915 | | | 920 | | | | | | 925 | | | |
| Gln | Asp | Arg | Leu | Val | Ala | Ser | Leu | Ala | Glu | Ala | Trp | Ala | Asn | Gly | Leu |
| | | | 930 | | | 935 | | | | | 940 | | | | |
| Ala | Val | Asp | Trp | Ser | Pro | Leu | Leu | Pro | Ser | Ala | Thr | Gly | His | His | Ser |
| 945 | | | | | 950 | | | | | 955 | | | | | 960 |
| Asp | Leu | Pro | Thr | Tyr | Ala | Phe | Gln | Thr | Glu | Arg | His | Trp | Leu | Gly | Glu |
| | | | | 965 | | | | | 970 | | | | | 975 | |
| Ile | Glu | Ala | Leu | Ala | Pro | Ala | Gly | Glu | Pro | Ala | Val | Gln | Pro | Ala | Val |
| | | | 980 | | | | | 985 | | | | | 990 | | |
| Leu | Arg | Thr | Glu | Ala | Ala | Glu | Pro | Ala | Glu | Leu | Asp | Arg | Asp | Glu | Gln |
| | | | 995 | | | 1000 | | | | | | 1005 | | | |
| Leu | Arg | Val | Ile | Leu | Asp | Lys | Val | Arg | Ala | Gln | Thr | Ala | Gln | Val | Leu |
| | | | 1010 | | | 1015 | | | | | 1020 | | | | |
| Gly | Tyr | Ala | Thr | Gly | Gly | Gln | Ile | Glu | Val | Asp | Arg | Thr | Phe | Arg | Glu |
| 1025 | | | | | 1030 | | | | | 1035 | | | | | 1040 |
| Ala | Gly | Cys | Thr | Ser | Leu | Thr | Gly | Val | Asp | Leu | Arg | Asn | Arg | Ile | Asn |
| | | | | 1045 | | | | | 1050 | | | | | 1055 | |
| Ala | Ala | Phe | Gly | Val | Arg | Met | Ala | Pro | Ser | Met | Ile | Phe | Asp | Phe | Pro |
| | | | 1060 | | | | | 1065 | | | | | 1070 | | |
| Thr | Pro | Glu | Ala | Leu | Ala | Glu | Gln | Leu | Leu | Leu | Val | Val | His | Gly | Glu |
| | | | 1075 | | | | 1080 | | | | | | 1085 | | |
| Ala | Ala | Ala | Asn | Pro | Ala | Gly | Ala | Glu | Pro | Ala | Pro | Val | Ala | Ala | Ala |
| | | | 1090 | | | 1095 | | | | | 1100 | | | | |
| Gly | Ala | Val | Asp | Glu | Pro | Val | Ala | Ile | Val | Gly | Met | Ala | Cys | Arg | Leu |
| 1105 | | | | | 1110 | | | | | 1115 | | | | | 1120 |
| Pro | Gly | Gly | Val | Ala | Ser | Pro | Glu | Asp | Leu | Trp | Arg | Leu | Val | Ala | Gly |
| | | | | 1125 | | | | | 1130 | | | | | 1135 | |
| Gly | Gly | Asp | Ala | Ile | Ser | Glu | Phe | Pro | Gln | Asp | Arg | Gly | Trp | Asp | Val |
| | | | 1140 | | | | | 1145 | | | | | 1150 | | |
| Glu | Gly | Leu | Tyr | His | Pro | Asp | Pro | Glu | His | Pro | Gly | Thr | Ser | Tyr | Val |
| | | | 1155 | | | 1160 | | | | | | 1165 | | | |
| Arg | Gln | Gly | Gly | Phe | Ile | Glu | Asn | Val | Ala | Gly | Phe | Asp | Ala | Ala | Phe |
| | | | | | 1175 | | | | | | 1180 | | | | |
| Phe | Gly | Ile | Ser | Pro | Arg | Glu | Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln | Arg |
| 1185 | | | | | 1190 | | | | | 1195 | | | | | 1200 |
| Leu | Leu | Leu | Glu | Thr | Ser | Trp | Glu | Ala | Val | Glu | Asp | Ala | Gly | Ile | Asp |
| | | | | 1205 | | | | | 1210 | | | | | 1215 | |
| Pro | Thr | Ser | Leu | Arg | Gly | Arg | Gln | Val | Gly | Val | Phe | Thr | Gly | Ala | Met |
| | | | 1220 | | | | | 1225 | | | | | | 1230 | |

Thr His Glu Tyr Gly Pro Ser Leu Arg Asp Gly Gly Glu Gly Leu Asp
 1235 1240 1245
 Gly Tyr Leu Leu Thr Gly Asn Thr Ala Ser Val Met Ser Gly Arg Val
 1250 1255 1260
 Ser Tyr Thr Leu Gly Leu Glu Gly Pro Ala Leu Thr Val Asp Thr Ala
 1265 1270 1275 1280
 Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala Leu Arg
 1285 1290 1295
 Lys Gly Glu Val Asp Met Ala Leu Ala Gly Gly Val Ala Val Met Pro
 1300 1305 1310
 Thr Pro Gly Met Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Gly
 1315 1320 1325
 Asp Gly Arg Ser Lys Ala Phe Ala Ala Ser Ala Asp Gly Thr Ser Trp
 1330 1335 1340
 Ser Glu Gly Val Gly Val Leu Leu Val Glu Arg Leu Ser Asp Ala Arg
 1345 1350 1355 1360
 Arg Asn Gly His Gln Val Leu Ala Val Val Arg Gly Ser Ala Leu Asn
 1365 1370 1375
 Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln
 1380 1385 1390
 Gln Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Thr Thr Ser
 1395 1400 1405
 Asp Val Asp Val Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp
 1410 1415 1420
 Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Gly Arg Asp
 1425 1430 1435 1440
 Asp Glu Gln Pro Leu Arg Leu Gly Ser Leu Lys Ser Asn Ile Gly His
 1445 1450 1455
 Thr Gln Ala Ala Gly Val Ser Gly Val Ile Lys Met Val Gln Ala
 1460 1465 1470
 Met Arg His Gly Leu Leu Pro Lys Thr Leu His Val Asp Glu Pro Ser
 1475 1480 1485
 Asp Gln Ile Asp Trp Ser Ala Gly Ala Val Glu Leu Leu Thr Glu Ala
 1490 1495 1500
 Val Asp Trp Pro Glu Lys Gln Asp Gly Gly Leu Arg Arg Ala Ala Val
 1505 1510 1515 1520
 Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Val Leu Glu Glu
 1525 1530 1535
 Ala Pro Val Val Val Glu Gly Ala Ser Val Val Glu Pro Ser Val Gly
 1540 1545 1550
 Gly Ser Ala Val Gly Gly Gly Val Thr Pro Trp Val Val Ser Ala Lys
 1555 1560 1565
 Ser Ala Ala Ala Leu Asp Ala Gln Ile Glu Arg Leu Ala Ala Phe Ala
 1570 1575 1580
 Ser Arg Asp Arg Thr Asp Asp Ala Asp Ala Gly Ala Val Asp Ala Gly
 1585 1590 1595 1600
 Ala Val Ala His Val Leu Ala Asp Gly Arg Ala Gln Phe Glu His Arg
 1605 1610 1615
 Ala Val Ala Leu Gly Ala Gly Ala Asp Asp Leu Val Gln Ala Leu Ala
 1620 1625 1630
 Asp Pro Asp Gly Leu Ile Arg Gly Thr Ala Ser Gly Val Gly Arg Val
 1635 1640 1645
 Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly Met Gly Ala
 1650 1655 1660
 Glu Leu Leu Asp Ser Ser Ala Val Phe Ala Ala Met Ala Glu Cys
 1665 1670 1675 1680
 Glu Ala Ala Leu Ser Pro Tyr Val Asp Trp Ser Leu Glu Ala Val Val
 1685 1690 1695
 Arg Gln Ala Pro Gly Ala Pro Thr Leu Glu Arg Val Asp Val Val Gln
 1700 1705 1710
 Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Arg Val Trp Gln His
 1715 1720 1725

| | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| His | Gly | Val | Thr | Pro | Gln | Ala | Val | Val | Gly | His | Ser | Gln | Gly | Glu | Ile |
| 1730 | | | | | | 1735 | | | | | 1740 | | | | |
| Ala | Ala | Ala | Tyr | Val | Ala | Gly | Ala | Leu | Pro | Leu | Asp | Asp | Ala | Ala | Arg |
| 1745 | | | | | 1750 | | | | | 1755 | | | | | 1760 |
| Val | Val | Thr | Leu | Arg | Ser | Lys | Ser | Ile | Ala | Ala | His | Leu | Ala | Gly | Lys |
| | | | | 1765 | | | | | 1770 | | | | | 1775 | |
| Gly | Gly | Met | Leu | Ser | Leu | Ala | Leu | Asn | Glu | Asp | Ala | Val | Leu | Glu | Arg |
| | | | 1780 | | | | | 1785 | | | | | 1790 | | |
| Leu | Ser | Asp | Phe | Asp | Gly | Leu | Ser | Val | Ala | Ala | Val | Asn | Gly | Pro | Thr |
| | | 1795 | | | | | 1800 | | | | | 1805 | | | |
| Ala | Thr | Val | Val | Ser | Gly | Asp | Pro | Val | Gln | Ile | Glu | Glu | Leu | Ala | Gln |
| | 1810 | | | | | 1815 | | | | | 1820 | | | | |
| Ala | Cys | Lys | Ala | Asp | Gly | Phe | Arg | Ala | Arg | Ile | Ile | Pro | Val | Asp | Tyr |
| 1825 | | | | | 1830 | | | | | 1835 | | | | | 1840 |
| Ala | Ser | His | Ser | Arg | Gln | Val | Glu | Ile | Ile | Glu | Ser | Glu | Leu | Ala | Gln |
| | | | | 1845 | | | | | 1850 | | | | | 1855 | |
| Val | Leu | Ala | Gly | Leu | Ser | Pro | Gln | Ala | Pro | Arg | Val | Pro | Phe | Phe | Ser |
| | | | 1860 | | | | | 1865 | | | | | 1870 | | |
| Thr | Leu | Glu | Gly | Thr | Trp | Ile | Thr | Glu | Pro | Val | Leu | Asp | Gly | Thr | Tyr |
| | | 1875 | | | | | 1880 | | | | | 1885 | | | |
| Trp | Tyr | Arg | Asn | Leu | Arg | His | Arg | Val | Gly | Phe | Ala | Pro | Ala | Ile | Glu |
| | 1890 | | | | | 1895 | | | | | 1900 | | | | |
| Thr | Leu | Ala | Val | Asp | Glu | Gly | Phe | Thr | His | Phe | Val | Glu | Val | Ser | Ala |
| 1905 | | | | | 1910 | | | | | 1915 | | | | | 1920 |
| His | Pro | Val | Leu | Thr | Met | Thr | Leu | Pro | Glu | Thr | Val | Thr | Gly | Leu | Gly |
| | | | | 1925 | | | | | 1930 | | | | | 1935 | |
| Thr | Leu | Arg | Arg | Glu | Gln | Gly | Gly | Gln | Glu | Arg | Leu | Val | Thr | Ser | Leu |
| | | | 1940 | | | | | 1945 | | | | | 1950 | | |
| Ala | Glu | Ala | Trp | Val | Asn | Gly | Leu | Pro | Val | Ala | Trp | Thr | Ser | Leu | Leu |
| | 1955 | | | | | | 1960 | | | | | 1965 | | | |
| Pro | Ala | Thr | Ala | Ser | Arg | Pro | Gly | Leu | Pro | Thr | Tyr | Ala | Phe | Gln | Ala |
| | 1970 | | | | | 1975 | | | | | 1980 | | | | |
| Glu | Arg | Tyr | Trp | Leu | Glu | Asn | Thr | Pro | Ala | Ala | Leu | Ala | Thr | Gly | Asp |
| 1985 | | | | | 1990 | | | | | 1995 | | | | | 2000 |
| Asp | Trp | Arg | Tyr | Arg | Ile | Asp | Trp | Lys | Arg | Leu | Pro | Ala | Ala | Glu | Gly |
| | | | | 2005 | | | | 2010 | | | | | | 2015 | |
| Ser | Glu | Arg | Thr | Gly | Leu | Ser | Gly | Arg | Trp | Leu | Ala | Val | Thr | Pro | Glu |
| | | | 2020 | | | | | 2025 | | | | | 2030 | | |
| Asp | His | Ser | Ala | Gln | Ala | Ala | Ala | Val | Leu | Thr | Ala | Leu | Val | Asp | Ala |
| | | 2035 | | | | | 2040 | | | | | 2045 | | | |
| Gly | Ala | Lys | Val | Glu | Val | Leu | Thr | Ala | Gly | Ala | Asp | Asp | Asp | Arg | Glu |
| | 2050 | | | | | 2055 | | | | | 2060 | | | | |
| Ala | Leu | Ala | Ala | Arg | Leu | Thr | Ala | Leu | Thr | Thr | Gly | Asp | Gly | Phe | Thr |
| 2065 | | | | | 2070 | | | | | 2075 | | | | | 2080 |
| Gly | Val | Val | Ser | Leu | Leu | Asp | Gly | Leu | Val | Pro | Gln | Val | Ala | Trp | Val |
| | | | | 2085 | | | | | 2090 | | | | | 2095 | |
| Gln | Ala | Leu | Gly | Asp | Ala | Gly | Ile | Lys | Ala | Pro | Leu | Trp | Ser | Val | Thr |
| | | | 2100 | | | | | 2105 | | | | | 2110 | | |
| Gln | Gly | Ala | Val | Ser | Val | Gly | Arg | Leu | Asp | Thr | Pro | Ala | Asp | Pro | Asp |
| | | 2115 | | | | | 2120 | | | | | 2125 | | | |
| Arg | Ala | Met | Leu | Trp | Gly | Leu | Gly | Arg | Val | Val | Ala | Leu | Glu | His | Pro |
| | 2130 | | | | | 2135 | | | | | 2140 | | | | |
| Glu | Arg | Trp | Ala | Gly | Leu | Val | Asp | Leu | Pro | Ala | Gln | Pro | Asp | Ala | Ala |
| 2145 | | | | | 2150 | | | | | 2155 | | | | | 2160 |
| Ala | Leu | Ala | His | Leu | Val | Thr | Ala | Leu | Ser | Gly | Ala | Thr | Gly | Glu | Asp |
| | | | 2165 | | | | | | 2170 | | | | | 2175 | |
| Gln | Ile | Ala | Ile | Arg | Thr | Thr | Gly | Leu | His | Ala | Arg | Arg | Leu | Ala | Arg |
| | | | 2180 | | | | | 2185 | | | | | 2190 | | |
| Ala | Pro | Leu | His | Gly | Arg | Arg | Pro | Thr | Arg | Asp | Trp | Gln | Pro | His | Gly |
| | | 2195 | | | | | 2200 | | | | | 2205 | | | |
| Thr | Val | Leu | Ile | Thr | Gly | Gly | Thr | Gly | Ala | Leu | Gly | Ser | His | Ala | Ala |
| | 2210 | | | | | 2215 | | | | | 2220 | | | | |

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| Arg | Trp | Met | Ala | His | His | Gly | Ala | Glu | His | Leu | Leu | Leu | Val | Ser | Arg | 2225 | 2230 | 2235 | 2240 |
| Ser | Gly | Glu | Gln | Ala | Pro | Gly | Ala | Thr | Gln | Leu | Thr | Ala | Glu | Leu | Thr | | 2245 | 2250 | 2255 |
| Ala | Ser | Gly | Ala | Arg | Val | Thr | Ile | Ala | Ala | Cys | Asp | Val | Ala | Asp | Pro | 2260 | 2265 | 2270 | |
| His | Ala | Met | Arg | Thr | Leu | Leu | Asp | Ala | Ile | Pro | Ala | Glu | Thr | Pro | Leu | 2275 | 2280 | 2285 | |
| Thr | Ala | Val | Val | His | Thr | Ala | Gly | Ala | Leu | Asp | Asp | Gly | Ile | Val | Asp | 2290 | 2295 | 2300 | |
| Thr | Leu | Thr | Ala | Glu | Gln | Val | Arg | Arg | Ala | His | Arg | Ala | Lys | Ala | Val | 2305 | 2310 | 2315 | 2320 |
| Gly | Ala | Ser | Val | Leu | Asp | Glu | Leu | Thr | Arg | Asp | Leu | Asp | Leu | Asp | Ala | 2325 | 2330 | 2335 | |
| Phe | Val | Leu | Phe | Ser | Ser | Val | Ser | Ser | Thr | Leu | Gly | Ile | Pro | Gly | Gln | 2340 | 2345 | 2350 | |
| Gly | Asn | Tyr | Ala | Pro | His | Asn | Ala | Tyr | Leu | Asp | Ala | Leu | Ala | Ala | Arg | 2355 | 2360 | 2365 | |
| Arg | Arg | Ala | Thr | Gly | Arg | Ser | Ala | Val | Ser | Val | Ala | Trp | Gly | Pro | Trp | 2370 | 2375 | 2380 | |
| Asp | Gly | Gly | Gly | Met | Ala | Ala | Gly | Asp | Gly | Val | Ala | Glu | Arg | Leu | Arg | 2385 | 2390 | 2395 | 2400 |
| Asn | His | Gly | Val | Pro | Gly | Met | Asp | Pro | Glu | Leu | Ala | Leu | Ala | Ala | Leu | 2405 | 2410 | 2415 | |
| Glu | Ser | Ala | Leu | Gly | Arg | Asp | Glu | Thr | Ala | Ile | Thr | Val | Ala | Asp | Ile | 2420 | 2425 | 2430 | |
| Asp | Trp | Asp | Arg | Phe | Tyr | Leu | Ala | Tyr | Ser | Ser | Gly | Arg | Pro | Gln | Pro | 2435 | 2440 | 2445 | |
| Leu | Val | Glu | Glu | Leu | Pro | Glu | Val | Arg | Arg | Ile | Ile | Asp | Ala | Arg | Asp | 2450 | 2455 | 2460 | |
| Ser | Ala | Thr | Ser | Gly | Gln | Gly | Gly | Ser | Ser | Ala | Gln | Gly | Ala | Asn | Pro | 2465 | 2470 | 2475 | 2480 |
| Leu | Ala | Glu | Arg | Leu | Ala | Ala | Ala | Ala | Pro | Gly | Glu | Arg | Thr | Glu | Ile | 2485 | 2490 | 2495 | |
| Leu | Leu | Gly | Leu | Val | Arg | Ala | Gln | Ala | Ala | Ala | Val | Leu | Arg | Met | Arg | 2500 | 2505 | 2510 | |
| Ser | Pro | Glu | Asp | Val | Ala | Ala | Asp | Arg | Ala | Phe | Lys | Asp | Ile | Gly | Phe | 2515 | 2520 | 2525 | |
| Asp | Ser | Leu | Ala | Gly | Val | Glu | Leu | Arg | Asn | Arg | Leu | Thr | Arg | Ala | Thr | 2530 | 2535 | 2540 | |
| Gly | Leu | Gln | Leu | Pro | Ala | Thr | Leu | Val | Phe | Asp | His | Pro | Thr | Pro | Leu | 2545 | 2550 | 2555 | 2560 |
| Ala | Leu | Val | Ser | Leu | Leu | Arg | Ser | Glu | Phe | Leu | Gly | Asp | Glu | Glu | Thr | 2565 | 2570 | 2575 | |
| Ala | Asp | Ala | Arg | Arg | Ser | Ala | Ala | Leu | Pro | Ala | Thr | Val | Gly | Ala | Gly | 2580 | 2585 | 2590 | |
| Ala | Gly | Ala | Gly | Ala | Gly | Thr | Asp | Ala | Asp | Asp | Asp | Pro | Ile | Ala | Ile | 2595 | 2600 | 2605 | |
| Val | Ala | Met | Ser | Cys | Arg | Tyr | Pro | Gly | Asp | Ile | Arg | Ser | Pro | Glu | Asp | 2610 | 2615 | 2620 | |
| Leu | Trp | Arg | Met | Leu | Ser | Glu | Gly | Gly | Glu | Gly | Ile | Thr | Pro | Phe | Pro | 2625 | 2630 | 2635 | 2640 |
| Thr | Asp | Arg | Gly | Trp | Asp | Leu | Asp | Gly | Leu | Tyr | Asp | Ala | Asp | Pro | Asp | 2645 | 2650 | 2655 | |
| Ala | Leu | Gly | Arg | Ala | Tyr | Val | Arg | Glu | Gly | Gly | Phe | Leu | His | Asp | Ala | 2660 | 2665 | 2670 | |
| Ala | Glu | Phe | Asp | Ala | Glu | Phe | Phe | Gly | Val | Ser | Pro | Arg | Glu | Ala | Leu | 2675 | 2680 | 2685 | |
| Ala | Met | Asp | Pro | Gln | Gln | Arg | Met | Leu | Leu | Thr | Thr | Ser | Trp | Glu | Ala | 2690 | 2695 | 2700 | |
| Phe | Glu | Arg | Ala | Gly | Ile | Glu | Pro | Ala | Ser | Leu | Arg | Gly | Ser | Ser | Thr | 2705 | 2710 | 2715 | 2720 |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Gly | Val | Phe | Ile | Gly | Leu | Ser | Tyr | Gln | Asp | Tyr | Ala | Ala | Arg | Val | Pro | 2725 | 2730 | 2735 |
| Asn | Ala | Pro | Arg | Gly | Val | Glu | Gly | Tyr | Leu | Leu | Thr | Gly | Ser | Thr | Pro | 2740 | 2745 | 2750 |
| Ser | Val | Ala | Ser | Gly | Arg | Ile | Ala | Tyr | Thr | Phe | Gly | Leu | Glu | Gly | Pro | 2755 | 2760 | 2765 |
| Ala | Thr | Thr | Val | Asp | Thr | Ala | Cys | Ser | Ser | Ser | Leu | Thr | Ala | Leu | His | 2770 | 2775 | 2780 |
| Leu | Ala | Val | Arg | Ala | Leu | Arg | Ser | Gly | Glu | Cys | Thr | Met | Ala | Leu | Ala | 2785 | 2790 | 2795 |
| Gly | Gly | Val | Ala | Met | Met | Ala | Thr | Pro | His | Met | Phe | Val | Glu | Phe | Ser | 2805 | 2810 | 2815 |
| Arg | Gln | Arg | Ala | Leu | Ala | Pro | Asp | Gly | Arg | Ser | Lys | Ala | Phe | Ser | Ala | 2820 | 2825 | 2830 |
| Asp | Ala | Asp | Gly | Phe | Gly | Ala | Ala | Glu | Gly | Val | Gly | Leu | Leu | Leu | Val | 2835 | 2840 | 2845 |
| Glu | Arg | Leu | Ser | Asp | Ala | Arg | Arg | Asn | Gly | His | Pro | Val | Leu | Ala | Val | 2850 | 2855 | 2860 |
| Val | Arg | Gly | Thr | Ala | Val | Asn | Gln | Asp | Gly | Ala | Ser | Asn | Gly | Leu | Thr | 2865 | 2870 | 2875 |
| Ala | Pro | Asn | Gly | Pro | Ser | Gln | Gln | Arg | Val | Ile | Arg | Gln | Ala | Leu | Ala | 2885 | 2890 | 2895 |
| Asp | Ala | Arg | Leu | Ala | Pro | Gly | Asp | Ile | Asp | Ala | Val | Glu | Thr | His | Gly | 2900 | 2905 | 2910 |
| Thr | Gly | Thr | Ser | Leu | Gly | Asp | Pro | Ile | Glu | Ala | Gln | Gly | Leu | Gln | Ala | 2915 | 2920 | 2925 |
| Thr | Tyr | Gly | Lys | Glu | Arg | Pro | Ala | Glu | Arg | Pro | Leu | Ala | Ile | Gly | Ser | 2930 | 2935 | 2940 |
| Val | Lys | Ser | Asn | Ile | Gly | His | Thr | Gln | Ala | Ala | Ala | Gly | Ala | Ala | Gly | 2945 | 2950 | 2955 |
| Ile | Ile | Lys | Met | Val | Leu | Ala | Met | Arg | His | Gly | Thr | Leu | Pro | Lys | Thr | 2965 | 2970 | 2975 |
| Leu | His | Ala | Asp | Glu | Pro | Ser | Pro | His | Val | Asp | Trp | Ala | Asn | Ser | Gly | 2980 | 2985 | 2990 |
| Leu | Ala | Leu | Val | Thr | Glu | Pro | Ile | Asp | Trp | Pro | Ala | Gly | Thr | Gly | Pro | 2995 | 3000 | 3005 |
| Arg | Arg | Ala | Ala | Val | Ser | Ser | Phe | Gly | Ile | Ser | Gly | Thr | Asn | Ala | His | 3010 | 3015 | 3020 |
| Val | Val | Leu | Glu | Gln | Ala | Pro | Asp | Ala | Ala | Gly | Glu | Val | Leu | Gly | Ala | 3025 | 3030 | 3035 |
| Asp | Glu | Val | Pro | Glu | Val | Ser | Glu | Thr | Val | Ala | Met | Ala | Gly | Thr | Ala | 3045 | 3050 | 3055 |
| Gly | Thr | Ser | Glu | Val | Ala | Glu | Gly | Ser | Glu | Ala | Ser | Glu | Ala | Pro | Ala | 3060 | 3065 | 3070 |
| Ala | Pro | Gly | Ser | Arg | Glu | Ala | Ser | Leu | Pro | Gly | His | Leu | Pro | Trp | Val | 3075 | 3080 | 3085 |
| Leu | Ser | Ala | Lys | Asp | Glu | Gln | Ser | Leu | Arg | Gly | Gln | Ala | Ala | Ala | Leu | 3090 | 3095 | 3100 |
| His | Ala | Trp | Leu | Ser | Glu | Pro | Ala | Ala | Asp | Leu | Ser | Asp | Ala | Asp | Gly | 3105 | 3110 | 3115 |
| Pro | Ala | Arg | Leu | Arg | Asp | Val | Gly | Tyr | Thr | Leu | Ala | Thr | Ser | Arg | Thr | 3125 | 3130 | 3135 |
| Ala | Phe | Ala | His | Arg | Ala | Ala | Val | Thr | Ala | Ala | Asp | Arg | Asp | Gly | Phe | 3140 | 3145 | 3150 |
| Leu | Asp | Gly | Leu | Ala | Thr | Leu | Ala | Gln | Gly | Gly | Thr | Ser | Ala | His | Val | 3155 | 3160 | 3165 |
| His | Leu | Asp | Thr | Ala | Arg | Asp | Gly | Thr | Thr | Ala | Phe | Leu | Phe | Thr | Gly | 3170 | 3175 | 3180 |
| Gln | Gly | Ser | Gln | Arg | Pro | Gly | Ala | Gly | Arg | Glu | Leu | Tyr | Asp | Arg | His | 3185 | 3190 | 3195 |
| Pro | Val | Phe | Ala | Arg | Ala | Leu | Asp | Glu | Ile | Cys | Ala | His | Leu | Asp | Gly | 3205 | 3210 | 3215 |

His Leu Glu Leu Pro Leu Leu Asp Val Met Phe Ala Ala Glu Gly Ser
 3220 3225 3230
 Ala Glu Ala Ala Leu Leu Asp Glu Thr Arg Tyr Thr Gln Cys Ala Leu
 3235 3240 3245
 Phe Ala Leu Glu Val Ala Leu Phe Arg Leu Val Glu Ser Trp Gly Met
 3250 3255 3260
 Arg Pro Ala Ala Leu Leu Gly His Ser Val Gly Glu Ile Ala Ala Ala
 3265 3270 3275 3280
 His Val Ala Gly Val Phe Ser Leu Ala Asp Ala Ala Arg Leu Val Ala
 3285 3290 3295
 Ala Arg Gly Arg Leu Met Gln Glu Leu Pro Ala Gly Gly Ala Met Leu
 3300 3305 3310
 Ala Val Gln Ala Ala Glu Asp Glu Ile Arg Val Trp Leu Glu Thr Glu
 3315 3320 3325
 Glu Arg Tyr Ala Gly Arg Leu Asp Val Ala Ala Val Asn Gly Pro Glu
 3330 3335 3340
 Ala Ala Val Leu Ser Gly Asp Ala Asp Ala Ala Arg Glu Ala Glu Ala
 3345 3350 3355 3360
 Tyr Trp Ser Gly Leu Gly Arg Arg Thr Arg Ala Leu Arg Val Ser His
 3365 3370 3375
 Ala Phe His Ser Ala His Met Asp Gly Met Leu Asp Gly Phe Arg Ala
 3380 3385 3390
 Val Leu Glu Thr Val Glu Phe Arg Arg Pro Ser Leu Thr Val Val Ser
 3395 3400 3405
 Asn Val Thr Gly Leu Ala Ala Gly Pro Asp Asp Leu Cys Asp Pro Glu
 3410 3415 3420
 Tyr Trp Val Arg His Val Arg Gly Thr Val Arg Phe Leu Asp Gly Val
 3425 3430 3435 3440
 Arg Val Leu Arg Asp Leu Gly Val Arg Thr Cys Leu Glu Leu Gly Pro
 3445 3450 3455
 Asp Gly Val Leu Thr Ala Met Ala Ala Asp Gly Leu Ala Asp Thr Pro
 3460 3465 3470
 Ala Asp Ser Ala Ala Gly Ser Pro Val Gly Ser Pro Ala Gly Ser Pro
 3475 3480 3485
 Ala Asp Ser Ala Ala Gly Ala Leu Arg Pro Arg Pro Leu Leu Val Ala
 3490 3495 3500
 Leu Leu Arg Arg Lys Arg Ser Glu Thr Glu Thr Val Ala Asp Ala Leu
 3505 3510 3515 3520
 Gly Arg Ala His Ala His Gly Thr Gly Pro Asp Trp His Ala Trp Phe
 3525 3530 3535
 Ala Gly Ser Gly Ala His Arg Val Asp Leu Pro Thr Tyr Ser Phe Arg
 3540 3545 3550
 Arg Asp Arg Tyr Trp Leu Asp Ala Pro Ala Ala Asp Thr Ala Val Asp
 3555 3560 3565
 Thr Ala Gly Leu Gly Leu Gly Thr Ala Asp His Pro Leu Leu Gly Ala
 3570 3575 3580
 Val Val Ser Leu Pro Asp Arg Asp Gly Leu Leu Leu Thr Gly Arg Leu
 3585 3590 3595 3600
 Ser Leu Arg Thr His Pro Trp Leu Ala Asp His Ala Val Leu Gly Ser
 3605 3610 3615
 Val Leu Leu Pro Gly Ala Ala Met Val Glu Leu Ala Ala His Ala Ala
 3620 3625 3630
 Glu Ser Ala Gly Leu Arg Asp Val Arg Glu Leu Thr Leu Leu Glu Pro
 3635 3640 3645
 Leu Val Leu Pro Glu His Gly Gly Val Glu Leu Arg Val Thr Val Gly
 3650 3655 3660
 Ala Pro Ala Gly Glu Pro Gly Gly Glu Ser Ala Gly Asp Gly Ala Arg
 3665 3670 3675 3680
 Pro Val Ser Leu His Ser Arg Leu Ala Asp Ala Pro Ala Gly Thr Ala
 3685 3690 3695
 Trp Ser Cys His Ala Thr Gly Leu Leu Ala Thr Asp Arg Pro Glu Leu
 3700 3705 3710

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Pro | Val | Ala | Pro | Asp | Arg | Ala | Ala | Met | Trp | Pro | Pro | Gln | Gly | Ala | Glu | 3715 | 3720 | 3725 |
| Glu | Val | Pro | Leu | Asp | Gly | Leu | Tyr | Glu | Arg | Leu | Asp | Gly | Asn | Gly | Leu | 3730 | 3735 | 3740 |
| Ala | Phe | Gly | Pro | Leu | Phe | Gln | Gly | Leu | Asn | Ala | Val | Trp | Arg | Tyr | Glu | 3745 | 3750 | 3755 |
| Gly | Glu | Val | Phe | Ala | Asp | Ile | Ala | Leu | Pro | Ala | Thr | Thr | Asn | Ala | Thr | 3765 | 3770 | 3775 |
| Ala | Pro | Ala | Thr | Ala | Asn | Gly | Gly | Gly | Ser | Ala | Ala | Ala | Ala | Pro | Tyr | 3780 | 3785 | 3790 |
| Gly | Ile | His | Pro | Ala | Leu | Leu | Asp | Ala | Ser | Leu | His | Ala | Ile | Ala | Val | 3795 | 3800 | 3805 |
| Gly | Gly | Leu | Val | Asp | Glu | Pro | Glu | Leu | Val | Arg | Val | Pro | Phe | His | Trp | 3810 | 3815 | 3820 |
| Ser | Gly | Val | Thr | Val | His | Ala | Ala | Gly | Ala | Ala | Ala | Ala | Arg | Val | Arg | 3825 | 3830 | 3835 |
| Leu | Ala | Ser | Ala | Gly | Thr | Asp | Ala | Val | Ser | Leu | Ser | Leu | Thr | Asp | Gly | 3845 | 3850 | 3855 |
| Glu | Gly | Arg | Pro | Leu | Val | Ser | Val | Glu | Arg | Leu | Thr | Leu | Arg | Pro | Val | 3860 | 3865 | 3870 |
| Thr | Ala | Asp | Gln | Ala | Ala | Ala | Ser | Arg | Val | Gly | Gly | Leu | Met | His | Arg | 3875 | 3880 | 3885 |
| Val | Ala | Trp | Arg | Pro | Tyr | Ala | Leu | Ala | Ser | Ser | Gly | Glu | Gln | Asp | Pro | 3890 | 3895 | 3900 |
| His | Ala | Thr | Ser | Tyr | Gly | Pro | Thr | Ala | Val | Leu | Gly | Lys | Asp | Glu | Leu | 3905 | 3910 | 3915 |
| Lys | Val | Ala | Ala | Ala | Leu | Glu | Ser | Ala | Gly | Val | Glu | Val | Gly | Leu | Tyr | 3925 | 3930 | 3935 |
| Pro | Asp | Leu | Ala | Ala | Leu | Ser | Gln | Asp | Val | Ala | Ala | Gly | Ala | Pro | Ala | 3940 | 3945 | 3950 |
| Pro | Arg | Thr | Val | Leu | Ala | Pro | Leu | Pro | Ala | Gly | Pro | Ala | Asp | Gly | Gly | 3955 | 3960 | 3965 |
| Ala | Glu | Gly | Val | Arg | Gly | Thr | Val | Ala | Arg | Thr | Leu | Glu | Leu | Leu | Gln | 3970 | 3975 | 3980 |
| Ala | Trp | Leu | Ala | Asp | Glu | His | Leu | Ala | Gly | Thr | Arg | Leu | Leu | Leu | Val | 3985 | 3990 | 3995 |
| Thr | Arg | Gly | Ala | Val | Arg | Asp | Pro | Glu | Gly | Ser | Gly | Ala | Asp | Asp | Gly | 4005 | 4010 | 4015 |
| Gly | Glu | Asp | Leu | Ser | His | Ala | Ala | Ala | Trp | Gly | Leu | Val | Arg | Thr | Ala | 4020 | 4025 | 4030 |
| Gln | Thr | Glu | Asn | Pro | Gly | Arg | Phe | Gly | Leu | Leu | Asp | Leu | Ala | Asp | Asp | 4035 | 4040 | 4045 |
| Ala | Ser | Ser | Tyr | Arg | Thr | Leu | Pro | Ser | Val | Leu | Ser | Asp | Ala | Gly | Leu | 4050 | 4055 | 4060 |
| Arg | Asp | Glu | Pro | Gln | Leu | Ala | Leu | His | Asp | Gly | Thr | Ile | Arg | Leu | Ala | 4065 | 4070 | 4075 |
| Arg | Leu | Ala | Ser | Val | Arg | Pro | Glu | Thr | Gly | Thr | Ala | Ala | Pro | Ala | Leu | 4085 | 4090 | 4095 |
| Ala | Pro | Glu | Gly | Thr | Val | Leu | Leu | Thr | Gly | Gly | Thr | Gly | Gly | Leu | Gly | 4100 | 4105 | 4110 |
| Gly | Leu | Val | Ala | Arg | His | Val | Val | Gly | Glu | Trp | Gly | Val | Arg | Arg | Leu | 4115 | 4120 | 4125 |
| Leu | Leu | Val | Ser | Arg | Arg | Gly | Thr | Asp | Ala | Pro | Gly | Ala | Asp | Glu | Leu | 4130 | 4135 | 4140 |
| Val | His | Glu | Leu | Glu | Ala | Leu | Gly | Ala | Asp | Val | Ser | Val | Ala | Ala | Cys | 4145 | 4150 | 4155 |
| Asp | Val | Ala | Asp | Arg | Glu | Ala | Leu | Thr | Ala | Val | Leu | Asp | Ala | Ile | Pro | 4165 | 4170 | 4175 |
| Ala | Glu | His | Pro | Leu | Thr | Ala | Val | Val | His | Thr | Ala | Gly | Val | Leu | Ser | 4180 | 4185 | 4190 |
| Asp | Gly | Thr | Leu | Pro | Ser | Met | Thr | Thr | Glu | Asp | Val | Glu | His | Val | Leu | 4195 | 4200 | 4205 |

Arg Pro Lys Val Asp Ala Ala Phe Leu Leu Asp Glu Leu Thr Ser Thr
 4210 4215 4220
 Pro Ala Tyr Asp Leu Ala Ala Phe Val Met Phe Ser Ser Ala Ala Ala
 4225 4230 4235 4240
 Val Phe Gly Gly Ala Gly Gln Gly Ala Tyr Ala Ala Ala Asn Ala Thr
 4245 4250 4255
 Leu Asp Ala Leu Ala Trp Arg Arg Arg Ala Ala Gly Leu Pro Ala Leu
 4260 4265 4270
 Ser Leu Gly Trp Gly Leu Trp Ala Glu Thr Ser Gly Met Thr Gly Glu
 4275 4280 4285
 Leu Gly Gln Ala Asp Leu Arg Arg Met Ser Arg Ala Gly Ile Gly Gly
 4290 4295 4300
 Ile Ser Asp Ala Glu Gly Ile Ala Leu Leu Asp Ala Ala Leu Arg Asp
 4305 4310 4315 4320
 Asp Arg His Pro Val Leu Leu Pro Leu Arg Leu Asp Ala Ala Gly Leu
 4325 4330 4335
 Arg Asp Ala Ala Gly Asn Asp Pro Ala Gly Ile Pro Ala Leu Phe Arg
 4340 4345 4350
 Asp Val Val Gly Ala Arg Thr Val Arg Ala Arg Pro Ser Ala Ala Ser
 4355 4360 4365
 Ala Ser Thr Thr Ala Gly Thr Ala Gly Thr Pro Gly Thr Ala Asp Gly
 4370 4375 4380
 Ala Ala Glu Thr Ala Ala Val Thr Leu Ala Asp Arg Ala Ala Thr Val
 4385 4390 4395 4400
 Asp Gly Pro Ala Arg Gln Arg Leu Leu Leu Glu Phe Val Val Gly Glu
 4405 4410 4415
 Val Ala Glu Val Leu Gly His Ala Arg Gly His Arg Ile Asp Ala Glu
 4420 4425 4430
 Arg Gly Phe Leu Asp Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu
 4435 4440 4445
 Arg Asn Arg Leu Asn Ser Ala Gly Gly Leu Ala Leu Pro Ala Thr Leu
 4450 4455 4460
 Val Phe Asp His Pro Ser Pro Ala Ala Leu Ala Ser His Leu Asp Ala
 4465 4470 4475 4480
 Glu Leu Pro Arg Gly Ala Ser Asp Gln Asp Gly Ala Gly Asn Arg Asn
 4485 4490 4495
 Gly Asn Glu Asn Gly Thr Thr Ala Ser Arg Ser Thr Ala Glu Thr Asp
 4500 4505 4510
 Ala Leu Leu Ala Gln Leu Thr Arg Leu Glu Gly Ala Leu Val Leu Thr
 4515 4520 4525
 Gly Leu Ser Asp Ala Pro Gly Ser Glu Glu Val Leu Glu His Leu Arg
 4530 4535 4540
 Ser Leu Arg Ser Met Val Thr Gly Glu Thr Gly Thr Gly Thr Ala Ser
 4545 4550 4555 4560
 Gly Ala Pro Asp Gly Ala Gly Ser Gly Ala Glu Asp Arg Pro Trp Ala
 4565 4570 4575
 Ala Gly Asp Gly Ala Gly Gly Gly Ser Glu Asp Gly Ala Gly Val Pro
 4580 4585 4590
 Asp Phe Met Asn Ala Ser Ala Glu Glu Leu Phe Gly Leu Leu Asp Gln
 4595 4600 4605
 Asp Pro Ser Thr Asp
 4610

<210> 32

<211> 11220

<212> DNA

<213> *Streptomyces venezuelae*

<400> 32

| | |
|--|-----|
| gtgtccacgg tgaacgaaga gaagtacctc gactacctgc gtcgtgccac ggcggaacctc | 60 |
| cacgaggccc gtggccgcct ccgcgagctg gaggcgaagg cgggcgagcc ggtggcgatc | 120 |
| gtcggcatgg cctgccgcct gcccggcggc gtcgcctcgc ccgaggacct gtggcggctg | 180 |

| | | | | | | |
|-------------|-------------|-------------|------------|------------|-------------|------|
| gtggccggcg | gcgaggacgc | gatctcggag | ttcccccagg | accgcggctg | ggacgtggag | 240 |
| ggcctgtacg | acccgaaccc | ggaggccacg | ggcaagagtt | acgcccgcga | ggccggattc | 300 |
| ctgtacgagg | cgggcgagtt | cgacgccgac | ttcttcggga | tctcgccgcg | cgaggccctc | 360 |
| gccatggacc | cgcagcagcg | tctcctcctg | gaggcctcct | gggaggcggt | cgagcacgcc | 420 |
| gggatccccg | cggccaccgc | gcgcggcacc | tcggtcggcg | tcttcaccgg | cgtgatgtac | 480 |
| cacgactacg | ccaccctgtc | caccgatgtc | ccggagggca | tcgagggcta | cctgggcacc | 540 |
| ggcaactccg | gcagtgtcgc | ctcggggccgc | gtcgcgtaca | cgcttggcct | ggagggggccg | 600 |
| gccgtcacgg | tcgacaccgc | ctgctcgtcc | tcgctggteg | ccctgcacct | cgccgtgcag | 660 |
| gccctgcgca | agggcgaggt | cgacatggcg | ctcgccggcg | gcgtgacggg | catgtcgacg | 720 |
| cccagcacct | tcgtcgagtt | cagccgtcag | cgcgggctgg | cgccggacgg | ccggtcgaag | 780 |
| tcctttctcgt | cgacggccga | cggcaccagc | tggtccgagg | gcgtcggcgt | cctcctcgtc | 840 |
| gagcgctcgt | ccgacgcgcg | tcgcaagggc | catcggatcc | tcgccgtggg | ccggggcacc | 900 |
| gccgtcaacc | aggacggcgc | cagcagggcg | ctcacggctc | cgaacgggcc | gtcgcagcag | 960 |
| cgcgatcatc | gacgtgccct | ggcggacgcc | cggtcacgca | cctccgacgt | ggacgtcgtc | 1020 |
| gaggccacag | gcacgggtac | gcgactcggc | gacccgatcg | aggcgcaggc | cgtcatcgcc | 1080 |
| acgtacgggc | agggccgtga | cggcgaacag | ccgctgcgcc | tcgggtcgtt | gaagtccaac | 1140 |
| atcggacaca | cccaggccgc | cgccgggtgtc | tccggcgtag | tcaagatggg | ccaggcgatg | 1200 |
| cgccacggcg | tcctgccgaa | gacgctccac | gtggagaagc | cgacggacca | ggtggactgg | 1260 |
| tccgcggggcg | cggtcgagct | gctcaccgag | gccatggact | ggccggacaa | gggcgacggc | 1320 |
| ggactgcgca | gggcccgcgt | ctcctccttc | ggcgtcagcg | ggacgaacgc | gcacgtcgtg | 1380 |
| ctcgaagagg | ccccggcggc | cgaggagacc | cctgcctccg | aggcgacccc | ggcgcgtcag | 1440 |
| ccgtcggtcg | gcgcggcctg | gtgtccgtgg | ctgggtcggg | cgaagactcc | ggccgcgctg | 1500 |
| gacgcccaga | tcggacgcct | cgccgcgttc | gcctcgcagg | gccgtacgga | cgccgccgat | 1560 |
| ccgggcgcgg | tcgctcgcgt | actggccggc | gggcgcgcgc | agttcgagca | ccgggcgcgtc | 1620 |
| gtgctcggca | ccggacagga | cgatttcgcg | caggcgctga | ccgctccgga | aggactgata | 1680 |
| cgccggcacgc | cctcggacgt | gggcccgggtg | gcgttcgtgt | tccccgggtc | gggcacgcag | 1740 |
| tgggcccggga | tgggcgcgca | actcctcgac | gtgtcgaagg | agttcgcggc | ggccatggcc | 1800 |
| gagtgcgaga | gcgcgtcttc | ccgctatgtc | gactggtcgc | tggaggccgt | cgtccggcag | 1860 |
| gcgcggggcg | cgcccacgct | ggagcgggtc | gacgtcgtcc | agcccgtgac | cttcgctgtc | 1920 |
| atggtttcgc | tggcgaaggt | ctggcagcac | cacggcgtag | gcgcgcaggc | cgtcgtcggc | 1980 |
| cactcgcagg | gcgagatcgc | cgccgcgtac | gtcgcgggtg | ccctcaccct | cgacgacgcc | 2040 |
| gcccgcgtcg | tcaccctgcg | cagcaagtcc | atcgccgccc | acctcgcggg | caagggcggc | 2100 |
| atgatctccc | tcgcccctcag | cgaggaagcc | acccggcagc | gcacgcagaa | cctccacgga | 2160 |
| ctgtcgatcg | ccgccgtcaa | cggccccacc | gccaccgtgg | tttcgggcga | ccccaccag | 2220 |
| atccaagagc | tcgtcagggc | gtgtgaggcc | gacgggggtc | gcgcacggat | catccccgtc | 2280 |
| gactacgcct | cccacagcgc | ccacgtcgag | accatcgaga | gcgaactcgc | cgaggctctc | 2340 |
| gccgggctca | gcccgcggac | acctgaggtg | ccgttcttct | cgacactcga | aggcgcctgg | 2400 |
| atcacccagg | cgggtgctcga | cggcacctac | tggtaccgca | acctccgcca | ccgcgtcggc | 2460 |
| ttcgcccccg | cgtcgcagac | cctcgccacc | gacgaaggct | tcaccactt | catcgaggtc | 2520 |
| agcgcaccac | ccgtcctcac | catgaccctc | cccagagacc | tcaccggcct | cggcaccttc | 2580 |
| cgccgcgaac | agggaggcca | ggagcgtctg | gtcacctcac | tcgccgaagc | ctggaccaac | 2640 |
| ggcctcacca | tcgactgggc | gcccgtcctc | cccaccgcaa | ccggccacca | ccccgagctc | 2700 |
| cccacctaag | ccttcacagc | ccgtcactac | tggctccacg | actccccgcg | cgtccagggc | 2760 |
| tccgtgcagg | actcctggcg | ctaccgcata | gactggaagc | gcctcgcggg | cgccgacgcg | 2820 |
| tccgagcgcg | cggggtgttc | cgggcgctgg | ctcgtcgtcg | tccccgagga | ccgttcgcgc | 2880 |
| gaggccgccc | cgggtgctcgc | cgcgtgtctc | ggcgcggcg | ccgaccccg | acagctggac | 2940 |
| gtgtcccccg | tgggcgaccg | gcagcggctc | gccgcgacgc | tgggcgaggc | cctggcggcg | 3000 |
| gccgggtggg | ccgtcgacgg | gtcctctctg | ctgctcgcgt | gggacgagag | cgcgcacccc | 3060 |
| ggccaccccc | cccccttcac | ccggggcacc | ggcgccaccc | tcaccctggg | gcaggcgtcg | 3120 |
| gaggacggcg | gcgtcgccgc | cccgtgtgtg | tgcgtgaccc | acggcgcggg | gtccgtcggc | 3180 |
| cgggcccagc | acgtcacctc | ccccgccag | gccatggtgt | ggggcatggg | ccgggtcgcc | 3240 |
| gccctggagc | accccagagc | gtggggcggc | ctgatcgacc | tgccctcgga | cgccgaccgg | 3300 |
| gcggccctgg | accgcatgac | cacggctcctc | gccggcggtg | cgggtgagga | ccaggctcgcg | 3360 |
| gtacgcgcct | ccgggtgtgt | cgcgcgcgcg | ctcgtccgcg | cctcctctcc | ggcgcacggc | 3420 |
| acggcttcgc | cgtggtggca | ggccgacggc | acggtgctcg | tcaccggtgc | cgaggagcct | 3480 |
| gcggccggcg | cggcgacagc | ccggctggcc | cgcgacggcg | ccgacacct | cctcctccac | 3540 |
| accacccccct | ccggcagcga | aggcgccgaa | ggcacctccg | gtgccgccga | ggactccggc | 3600 |
| ctcgccgggc | tcgtcgccga | actcgcggac | ctgggcgcga | cggccaccgt | cgtgacctgc | 3660 |
| gacctcacgg | acgcggaggc | ggccgcccgg | ctgctcgcgc | gcgtctccga | cgcgcacccg | 3720 |
| ctcagcgccg | tcctccacct | gccgcccacc | gtcgactccg | agccgctcgc | cgcgaccgac | 3780 |
| gcggacgcgc | tcgcccgtgt | cgtgaccgcg | aaggccaccg | ccgcgctcca | cctggaccgc | 3840 |
| ctcctgcggg | aggccgcggc | tgccggaggc | cgtccgcccc | tcctggtcct | cttctcctcg | 3900 |

| | | | | | | |
|-------------|-------------|-------------|------------|-------------|-------------|------|
| gtcgccgcga | tctggggcgg | cgccgggtcag | ggcgcgtagc | ccgccgggtac | ggccttcctc | 3960 |
| gacgcccccg | ccgggtcagca | ccggggccgac | ggccccaccg | tgacctcggt | ggcctggagc | 4020 |
| ccctgggagg | gcagcccgct | caccgagggg | gcgaccgggg | agcggtgcg | ccgcctcggc | 4080 |
| ctgcgcccc | tcgccccgc | gacggcgctc | accgccctgg | acaccgcgt | cggccacggc | 4140 |
| gacaccgccc | tcacgatcgc | cgacgtcgac | tggtcgagct | tcgcccccg | cttcaccacg | 4200 |
| gccccggccg | gcacctctct | cgccgatctg | cccaggcgcc | gccgcgcgt | cgacgagcag | 4260 |
| cagtcgacga | cggccgcccga | cgacaccgtc | ctgagccgcg | agctcggtgc | gctcaccggc | 4320 |
| gccgaacagc | agcgccgtat | gcaggagtgt | gtccgcgagc | acctcgccgt | ggctctcaac | 4380 |
| caccctctcc | ccgaggccgt | cgacacgggg | cgggccttcc | gtgacctcgg | attcgactcg | 4440 |
| ctgacggcgg | tcgagctccg | caaccgcctc | aagaacgcc | ccggcctggc | cctcccggcc | 4500 |
| actctggtct | tcgactaccc | gaccccccg | acgtggcg | agttcctcct | cgcgagatc | 4560 |
| ctgggcgag | aggccgggtg | cggcgagcag | cttcgggtgg | acggcggggt | cgacgacgag | 4620 |
| cccgtcgcga | tcgtcggcat | ggcggtccgc | ctgcggggcg | gtgtcgccct | gccggaggag | 4680 |
| ctgtggcgcc | tggtggccgg | cggcgaggac | gcgatctccg | gcttcccgca | ggaccgaggc | 4740 |
| tgggacgtgg | aggggctgta | cgaccgggac | ccggacgcgt | ccggggcgac | gtactgccgt | 4800 |
| gccggtggct | tcctcgacga | ggcgggcgag | ttcgacgccg | acttcttcgg | gatctcgccg | 4860 |
| cgcgaggccc | tcgccatgga | cccgcagcag | cggctcctcc | tggagacctc | ctgggaggcc | 4920 |
| gtcgaggacg | ccgggatcga | cccgaacctc | cttcaggggg | agcaggtcgg | cgtgttcgcg | 4980 |
| ggcaccaacg | gccccacta | cgagccgctg | ctccgcaaca | ccgccgagga | tcttgagggt | 5040 |
| tacgtcggga | cgggcaacgc | cgccagcatc | atgtcggggc | gtgtctcgta | caccctcggc | 5100 |
| ctggaggggc | cggcgctcac | ggtcgacacc | gcctgtcctc | cctcgctggt | cgccctgcac | 5160 |
| ctcgccgtgc | aggccctgcg | caagggcgaa | tcgggactgg | cgctcgccgg | cgggtgtgacg | 5220 |
| gtcatgtcga | cgccccacgac | gttcgtggag | ttcagccggc | agcgccgggt | cgcgaggagc | 5280 |
| ggccgggtcga | aggcgctcgc | cgcgtcggcg | gacggcttcg | gccccggcga | gggcgtcggc | 5340 |
| atgctcctcg | tcgagcgctc | gtcggacgcc | cgccgcaacg | gacaccgtgt | gctggcggtc | 5400 |
| gtgcgcggca | gcgcgggtcaa | ccaggacggc | gcgagcaacg | gcctgaccgc | cccgaacggg | 5460 |
| ccctcgcagc | agcggtcat | ccggcgcgcg | ctcgcgagcg | cccgaactgac | gaccgccgac | 5520 |
| gtggacgtcg | tcgaggccca | cggcacgggg | acgcgactcg | gcgaccgat | cgaggcacag | 5580 |
| ggcctcatcg | ccacctacgg | ccagggcgcg | gacaccaaac | agccgctgcg | cctggggtcg | 5640 |
| ttgaagtcca | cacatcgaca | caccagggcc | gccgcgggtg | tctccggcat | catcaagatg | 5700 |
| gtccaggcga | tcgccacagg | cgtcctgccc | aagacgtccc | acgtggaccg | gccgtcggac | 5760 |
| cagatcgact | ggtcggcggg | cacggtcgag | ctgctcaccg | aggccatgga | ctggccgagg | 5820 |
| aagcaggagg | gcgggctgcg | ccgcgcggcc | gtctcctcct | tcggcatcag | cggcacgaac | 5880 |
| gcgcacatcg | tgctcgaaga | agccccggtc | gacgaggacg | ccccggcgga | cgagccgtcg | 5940 |
| gtcggcggtg | tggtgccgtg | gctcgtgtcc | gcgaagactc | cggccgcgct | ggacgcccag | 6000 |
| atcggaacgcc | tcgccgcgtt | cgctcgcag | ggcgtacgg | acgcgcgccg | tccgggcgcg | 6060 |
| gtcgctcgcg | tactggccgg | cgggcgtgcg | cagttcgagc | accgggcccgt | cgcgctcggc | 6120 |
| accggacagg | acgacctggc | ggccgcactg | gccgcgcctg | agggtctggt | ccgggggtgtg | 6180 |
| gcctccgggtg | tggttcgagt | ggcgttcgtg | ttcccgggac | agggcacgca | gtgggcccgg | 6240 |
| atgggtgccg | aactcctcga | cgtgtcgaag | gagttcgcgg | cggccatggc | cgagtgcgag | 6300 |
| gccgcgctcg | ctccgtacgt | ggactggctg | ctggaggccg | tcgtccgaca | ggcccccgcc | 6360 |
| gcgcccacgc | tggagcgggt | cgatgtcgtc | cagcccgtga | cgttcgccgt | catggtctcg | 6420 |
| ctggcgaaag | tctggcagca | ccacgggggtg | acccgcgaag | ccgtcgtcgg | ccactcgcag | 6480 |
| ggcgagatcg | ccgccgcgta | cgtcgccggg | gccctgagcc | tggacgacgc | cgctcgtgtc | 6540 |
| gtgacctcgc | gcagcaagtc | catcggcgcc | cacctcgccg | gccaggggcg | catgctgtcc | 6600 |
| ctcgcgctga | gcgaggcgcc | cgttgtggag | cgactggccg | ggttcgacgg | gctgtccgtc | 6660 |
| gccgccgtca | acgggcttac | cgccaccgtg | gtttcgggcg | acccgaccga | gatccaagag | 6720 |
| ctcgctcagg | cgtgtgaggc | cgacgggggtc | cgcgcacgga | tcatccccgt | cgactacgcc | 6780 |
| tcccacagcg | cccacgtcga | gaccatcgag | agcgaactcg | ccgacgtcct | ggcggggttg | 6840 |
| tccccccaga | caccccaggt | ccccttcttc | tccaccctcg | aaggcgccct | gatcaccgaa | 6900 |
| cccgcctcgc | acggcggtta | ctggtaccgc | aacctccgcc | atcgtgtggg | cttcgccccg | 6960 |
| gccgtcgaaa | ccctggccac | cgacgaaggc | ttcaccact | tcgtcgagggt | cagcgccac | 7020 |
| cccgtcctca | ccatggcgct | gcccgaagac | gtcaccggac | tcggcaccct | ccgcctgac | 7080 |
| aacggcgagg | agcaccgcct | caccacctcc | ctcgccgagg | cctgggccaa | cggcctcacc | 7140 |
| gtcgactggg | cctctctcct | ccccaccag | accaccacc | ccgatctgcc | cacctacgcc | 7200 |
| ttccagaccg | agcgctactg | gccgcagccc | gacctctccg | ccgcgggtga | catcacctcc | 7260 |
| gccggtctcg | gggcggccga | gcacccgctg | ctcggcgcgg | ccgtggcgct | cgcgactcc | 7320 |
| gacggctgcc | tgctcacggg | gagcctctcc | ctccgtacgc | acccctggct | ggcgggaccac | 7380 |
| gcgggtggccg | gcaccgtgct | gctgccggga | acggcgttcg | tggagctggc | gttccgagcc | 7440 |
| ggggaccagg | tcggttgcca | tctgggtcgag | gagctcacc | tcgacgcgcc | gctcgtgctg | 7500 |
| cccgcgtcgtg | gcgcgggtccg | tgtgcagctg | tccgtcggcg | cgagcgacga | gtccggggcgt | 7560 |
| cgtacctctcg | ggctctacgc | gcacccggag | gacgcgcccg | gcgaggcgga | gtggacgcgg | 7620 |

| | | | | | | |
|-------------|-------------|-------------|------------|-------------|-------------|-------|
| cacgccaccg | gtgtgctggc | cgcccgctgcg | gaccgcaccg | cccccgctcgc | cgaccggag | 7680 |
| gctggccgc | cgccgggccc | cgagccgggtg | gacgtggacg | gtctgtacga | gcgcttcgcg | 7740 |
| gcgaacggct | acggctacgg | ccccctcttc | cagggcgctc | gtggtgtctg | gcggcggtggc | 7800 |
| gacgaggtgt | tcgccgacgt | ggccctgccg | gccgaggtcg | ccggtgccga | gggcgcgcgg | 7860 |
| ttcggccttc | acccggcgct | gctcgacgcc | gccgtgcagg | cgcccggtgc | ggcccggggc | 7920 |
| gttcggcgcg | ggcacgcggc | tgccgttcgc | ctggagcggg | atctcctgta | cgcggtcggc | 7980 |
| gccaccgccc | tcgcgctgcg | gctggcccc | gccggcccg | acacggtgtc | cgtgagcgcc | 8040 |
| gccgactcct | ccgggcagcc | ggtgttcgcc | gccgactccc | tcacggtgct | gcccgtcgac | 8100 |
| cccgcgcagc | tggcggcctt | cagcgacccg | actctggacg | cgctgcacct | gctggagtgg | 8160 |
| accgcctggg | acggtgccgc | gcaggccctg | cccggcgcg | tcgtgctggg | cgccgacgcc | 8220 |
| gacggtctcg | ccgcggcgct | gcgcgccggg | ggcaccgagg | tcctgtcctt | cccggacctt | 8280 |
| acggacctgg | tggaggccgt | cgaccggggc | gagaccccg | ccccggcgac | cgtcctgggtg | 8340 |
| gcctgccccg | ccgccggccc | cgatggggcc | gagcatgtcc | gcgaggccct | gcacgggtcg | 8400 |
| ctcgcgctga | tgaggcgctg | gctggccgac | gagcggttca | ccgatgggcg | cctggtgctc | 8460 |
| gtgacccgcg | acgcggtcgc | cgcccgttcc | ggcgacggcc | tgcggtccac | gggacaggcc | 8520 |
| gccgtctggg | gcctcggccg | gtccgcgcag | acggagagcc | cgggccgggt | cgtcctgctc | 8580 |
| gacctcgccg | gggaagcccg | gacggccggg | gacgccaccg | ccggggacgg | cctgacgacc | 8640 |
| ggggacgcca | ccgtcgggcg | cacctctgga | gacgccgccc | tcggcagcgc | cctcgcgacc | 8700 |
| gcctcggtct | cgggcgagcc | gcagctcgcc | ctccgggacg | gggcgctcct | cgtaccccg | 8760 |
| ctggcgcggg | ccgccgcgcc | cgccgcggcc | gacggcctcg | ccgcggccga | cggcctcgcc | 8820 |
| gctctgcgcg | tcgccgcgc | tcggcccttc | tgccgtctgg | agcccggtac | ggacggcagc | 8880 |
| ctggagagcc | tcacggcgcc | gcccggcgac | gccgagacc | tcgcccggga | ccgctcgcc | 8940 |
| ccgggacagg | tcgcgcatgc | gatccggggc | accggtctca | acttcgcgca | cgtcctgata | 9000 |
| gccctcgcca | tgtaacccga | tcgggcgctg | atgggcaccg | agggagccgg | cgtggtcacc | 9060 |
| gcgaccggcc | ccggcgtcac | gcacctcgcc | cccggcgacc | gggtcatggg | cctgctctcc | 9120 |
| ggcgcgctacg | ccccggtcgt | cgtggcgagc | gcgcggaccg | tcgcgcggat | gcccgagggg | 9180 |
| tggacgttcg | cccaggggcg | ctccgtgccc | gtggtgttcc | tgacggccgt | ctacgccctg | 9240 |
| cgcgacctgg | cggacgtcaa | gcccggcgag | cgctcctggg | tcactccgc | cgccgggtggc | 9300 |
| gtgggcatgg | ccgccgtgca | gctcgcccgg | cactggggcg | tggaggtcca | cggcacggcg | 9360 |
| agtacggga | agtgggagcg | cctgcgcgcg | ctcgccctgg | acgacgcgca | catgcctcc | 9420 |
| tcgccgaccc | tggacttcga | gtccgcgttc | cgtgccgctt | ccggcggggc | ggcgatggac | 9480 |
| gtcgctactga | actcgctcgc | ccgcgagttc | gtcgacgcct | cgctgcgcct | gctcggggcg | 9540 |
| ggcgggccgg | tcgtggagat | ggggaagacc | gacgtccgcg | acgcggagcg | ggtcgccgcc | 9600 |
| gaccaccccg | gtgtcggtca | ccgcgccttc | gacctggggc | aggccggggc | ggagcggatc | 9660 |
| ggcgagatgc | tcgccgaggt | catcgccctc | ttcgaggacg | gggtgctccg | gcacctgccc | 9720 |
| gtcacgacct | gggacgtgcg | ccgggccccg | gacgccttcc | ggcacgtcag | ccaggccccg | 9780 |
| cacacgggca | aggctcgtcct | cacgatgccg | tcgggcctcg | acccggaggg | tacggtcctg | 9840 |
| ctgaccggcg | gcaccgggtg | gctggggggc | atcgtggccc | ggcacgtggg | gggcgagtgg | 9900 |
| ggcgctacgac | gcctgctgct | cgtgagccgg | cggggcagg | acgccccggg | cgccggcgag | 9960 |
| ctcgctgcacg | agctggaggc | cctgggagcc | cagctctcgg | tggccgcgtg | cgacgtcgcc | 10020 |
| gaccgcgaag | ccctcaccgc | cgtactcgac | tcgatccccg | ccgaacaccc | gctcaccgcg | 10080 |
| gtcgctccaca | cggcaggcgt | cctctccgac | ggcaccttcc | cctcgatgac | agcggaggat | 10140 |
| gtggaacacg | tactgcgtcc | caaggctcgac | gccgcgttcc | tcctcgacga | actcacctcg | 10200 |
| acgcccggct | acgacctggc | agcgttcgtc | atgttctcct | ccgccgccgc | cgtcttcggg | 10260 |
| ggcgcggggg | agggcgccca | cgccgcgcc | aacgccaccc | tcgacgccct | cgcttgccgc | 10320 |
| cgccggacag | ccggactccc | cgccctctcc | ctcggttggg | gcctctgggg | cgagaccagc | 10380 |
| ggcatgaccg | cgggactcag | cgacaccgac | cgctcgcgcc | tggcccgctc | cggggcgagc | 10440 |
| cccatggaca | gcgagctgac | cctgtccctc | ctggacggcg | ccatgcgcgc | cgacgacctg | 10500 |
| gcgctcgctc | cgatcgccct | ggacgtcgcc | gcgctccgcg | cccagcagcg | cgacggcatg | 10560 |
| ctggcgccgc | tgctcagcgg | gctcaccgcg | ggatcgcggg | tcggcgggcg | gccgggtcaac | 10620 |
| cagcgagggg | cagccgcggg | aggcgcgggc | gaggcgagca | cggacctcgg | cgggcggctc | 10680 |
| gccgcgatga | caccggacga | ccgggtcgcg | cacctgcggg | acctcgtccg | tacgcacgtg | 10740 |
| gcgaccgtcc | tgggacacgg | caccccagac | cgggtggacc | tggagcgggc | cttcgcgcgac | 10800 |
| accggtttcg | actcgctcac | cgccgtcgaa | ctccgcaacc | gtctcaacgc | cgcgaccggg | 10860 |
| ctgcggctgc | cgccacgcgt | ggtcttcgac | cacccacccc | cgggggagct | cgccggggcac | 10920 |
| ctgctcgacg | aactcgccac | ggccgcgggc | gggtcctggg | cggaaaggac | cgggtccgga | 10980 |
| gacacggcct | cggcgaccca | tcggcgagacc | acggcgggcc | tcgccgaact | cgaccgctgt | 11040 |
| gaaggcgctg | tcgcctccct | cgcgcccgcc | gccggcgggc | gtccggagct | cgccgcccgg | 11100 |
| ctcagggcg | tggccgcggc | cctgggggac | gacggcgacg | acgccaccga | cctggacgag | 11160 |
| gcgtccgacg | acgacctctt | ctccttcata | gacaaggagc | tgggcgactc | cgacttctga | 11220 |

<210> 33
 <211> 3739
 <212> PRT
 <213> Streptomyces venezuelae

<400> 33

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Ser | Thr | Val | Asn | Glu | Glu | Lys | Tyr | Leu | Asp | Tyr | Leu | Arg | Arg | Ala |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Thr | Ala | Asp | Leu | His | Glu | Ala | Arg | Gly | Arg | Leu | Arg | Glu | Leu | Glu | Ala |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Lys | Ala | Gly | Glu | Pro | Val | Ala | Ile | Val | Gly | Met | Ala | Cys | Arg | Leu | Pro |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Gly | Gly | Val | Ala | Ser | Pro | Glu | Asp | Leu | Trp | Arg | Leu | Val | Ala | Gly | Gly |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Glu | Asp | Ala | Ile | Ser | Glu | Phe | Pro | Gln | Asp | Arg | Gly | Trp | Asp | Val | Glu |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Gly | Leu | Tyr | Asp | Pro | Asn | Pro | Glu | Ala | Thr | Gly | Lys | Ser | Tyr | Ala | Arg |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Glu | Ala | Gly | Phe | Leu | Tyr | Glu | Ala | Gly | Glu | Phe | Asp | Ala | Asp | Phe | Phe |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Gly | Ile | Ser | Pro | Arg | Glu | Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln | Arg | Leu |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Leu | Leu | Glu | Ala | Ser | Trp | Glu | Ala | Phe | Glu | His | Ala | Gly | Ile | Pro | Ala |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Ala | Thr | Ala | Arg | Gly | Thr | Ser | Val | Gly | Val | Phe | Thr | Gly | Val | Met | Tyr |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| His | Asp | Tyr | Ala | Thr | Arg | Leu | Thr | Asp | Val | Pro | Glu | Gly | Ile | Glu | Gly |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Tyr | Leu | Gly | Thr | Gly | Asn | Ser | Gly | Ser | Val | Ala | Ser | Gly | Arg | Val | Ala |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Tyr | Thr | Leu | Gly | Leu | Glu | Gly | Pro | Ala | Val | Thr | Val | Asp | Thr | Ala | Cys |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Ser | Ser | Ser | Leu | Val | Ala | Leu | His | Leu | Ala | Val | Gln | Ala | Leu | Arg | Lys |
| | | 210 | | | | 215 | | | | | 220 | | | | |
| Gly | Glu | Val | Asp | Met | Ala | Leu | Ala | Gly | Gly | Val | Thr | Val | Met | Ser | Thr |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Pro | Ser | Thr | Phe | Val | Glu | Phe | Ser | Arg | Gln | Arg | Gly | Leu | Ala | Pro | Asp |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Gly | Arg | Ser | Lys | Ser | Phe | Ser | Ser | Thr | Ala | Asp | Gly | Thr | Ser | Trp | Ser |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Glu | Gly | Val | Gly | Val | Leu | Leu | Val | Glu | Arg | Leu | Ser | Asp | Ala | Arg | Arg |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Lys | Gly | His | Arg | Ile | Leu | Ala | Val | Val | Arg | Gly | Thr | Ala | Val | Asn | Gln |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Asp | Gly | Ala | Ser | Ser | Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | Ser | Gln | Gln |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Arg | Val | Ile | Arg | Arg | Ala | Leu | Ala | Asp | Ala | Arg | Leu | Thr | Thr | Ser | Asp |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Val | Asp | Val | Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Arg | Leu | Gly | Asp | Pro |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Ile | Glu | Ala | Gln | Ala | Val | Ile | Ala | Thr | Tyr | Gly | Gln | Gly | Arg | Asp | Gly |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Glu | Gln | Pro | Leu | Arg | Leu | Gly | Ser | Leu | Lys | Ser | Asn | Ile | Gly | His | Thr |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| Gln | Ala | Ala | Ala | Gly | Val | Ser | Gly | Val | Ile | Lys | Met | Val | Gln | Ala | Met |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Arg | His | Gly | Val | Leu | Pro | Lys | Thr | Leu | His | Val | Glu | Lys | Pro | Thr | Asp |
| | | | | 405 | | | | | 410 | | | | | 415 | |
| Gln | Val | Asp | Trp | Ser | Ala | Gly | Ala | Val | Glu | Leu | Leu | Thr | Glu | Ala | Met |
| | | | 420 | | | | | 425 | | | | | 430 | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Trp | Pro | Asp | Lys | Gly | Asp | Gly | Gly | Leu | Arg | Arg | Ala | Ala | Val | Ser |
| | | 435 | | | | | 440 | | | | | 445 | | | |
| Ser | Phe | Gly | Val | Ser | Gly | Thr | Asn | Ala | His | Val | Val | Leu | Glu | Glu | Ala |
| | 450 | | | | | 455 | | | | | 460 | | | | |
| Pro | Ala | Ala | Glu | Glu | Thr | Pro | Ala | Ser | Glu | Ala | Thr | Pro | Ala | Val | Glu |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 |
| Pro | Ser | Val | Gly | Ala | Gly | Leu | Val | Pro | Trp | Leu | Val | Ser | Ala | Lys | Thr |
| | | | 485 | | | | | | 490 | | | | | 495 | |
| Pro | Ala | Ala | Leu | Asp | Ala | Gln | Ile | Gly | Arg | Leu | Ala | Ala | Phe | Ala | Ser |
| | | 500 | | | | | | 505 | | | | | 510 | | |
| Gln | Gly | Arg | Thr | Asp | Ala | Ala | Asp | Pro | Gly | Ala | Val | Ala | Arg | Val | Leu |
| | 515 | | | | | | 520 | | | | | 525 | | | |
| Ala | Gly | Gly | Arg | Ala | Glu | Phe | Glu | His | Arg | Ala | Val | Val | Leu | Gly | Thr |
| | 530 | | | | | 535 | | | | | 540 | | | | |
| Gly | Gln | Asp | Asp | Phe | Ala | Gln | Ala | Leu | Thr | Ala | Pro | Glu | Gly | Leu | Ile |
| 545 | | | | | 550 | | | | | 555 | | | | | 560 |
| Arg | Gly | Thr | Pro | Ser | Asp | Val | Gly | Arg | Val | Ala | Phe | Val | Phe | Pro | Gly |
| | | | 565 | | | | | | 570 | | | | | 575 | |
| Gln | Gly | Thr | Gln | Trp | Ala | Gly | Met | Gly | Ala | Glu | Leu | Leu | Asp | Val | Ser |
| | | 580 | | | | | | 585 | | | | | 590 | | |
| Lys | Glu | Phe | Ala | Ala | Ala | Met | Ala | Glu | Cys | Glu | Ser | Ala | Leu | Ser | Arg |
| | 595 | | | | | | 600 | | | | | 605 | | | |
| Tyr | Val | Asp | Trp | Ser | Leu | Glu | Ala | Val | Val | Arg | Gln | Ala | Pro | Gly | Ala |
| | 610 | | | | | 615 | | | | | 620 | | | | |
| Pro | Thr | Leu | Glu | Arg | Val | Asp | Val | Val | Gln | Pro | Val | Thr | Phe | Ala | Val |
| 625 | | | | | 630 | | | | | 635 | | | | | 640 |
| Met | Val | Ser | Leu | Ala | Lys | Val | Trp | Gln | His | His | Gly | Val | Thr | Pro | Gln |
| | | | 645 | | | | | | 650 | | | | | 655 | |
| Ala | Val | Val | Gly | His | Ser | Gln | Gly | Glu | Ile | Ala | Ala | Ala | Tyr | Val | Ala |
| | | 660 | | | | | | 665 | | | | | 670 | | |
| Gly | Ala | Leu | Thr | Leu | Asp | Asp | Ala | Ala | Arg | Val | Val | Thr | Leu | Arg | Ser |
| | 675 | | | | | | 680 | | | | | 685 | | | |
| Lys | Ser | Ile | Ala | Ala | His | Leu | Ala | Gly | Lys | Gly | Gly | Met | Ile | Ser | Leu |
| | 690 | | | | | 695 | | | | | 700 | | | | |
| Ala | Leu | Ser | Glu | Glu | Ala | Thr | Arg | Gln | Arg | Ile | Glu | Asn | Leu | His | Gly |
| 705 | | | | | 710 | | | | | 715 | | | | | 720 |
| Leu | Ser | Ile | Ala | Ala | Val | Asn | Gly | Pro | Thr | Ala | Thr | Val | Val | Ser | Gly |
| | | | 725 | | | | | | 730 | | | | | 735 | |
| Asp | Pro | Thr | Gln | Ile | Gln | Glu | Leu | Ala | Gln | Ala | Cys | Glu | Ala | Asp | Gly |
| | | 740 | | | | | | 745 | | | | | 750 | | |
| Val | Arg | Ala | Arg | Ile | Ile | Pro | Val | Asp | Tyr | Ala | Ser | His | Ser | Ala | His |
| | 755 | | | | | | 760 | | | | | 765 | | | |
| Val | Glu | Thr | Ile | Glu | Ser | Glu | Leu | Ala | Glu | Val | Leu | Ala | Gly | Leu | Ser |
| | 770 | | | | | 775 | | | | | 780 | | | | |
| Pro | Arg | Thr | Pro | Glu | Val | Pro | Phe | Phe | Ser | Thr | Leu | Glu | Gly | Ala | Trp |
| 785 | | | | | 790 | | | | | 795 | | | | | 800 |
| Ile | Thr | Glu | Pro | Val | Leu | Asp | Gly | Thr | Tyr | Trp | Tyr | Arg | Asn | Leu | Arg |
| | | | 805 | | | | | | 810 | | | | | 815 | |
| His | Arg | Val | Gly | Phe | Ala | Pro | Ala | Val | Glu | Thr | Leu | Ala | Thr | Asp | Glu |
| | | 820 | | | | | | 825 | | | | | 830 | | |
| Gly | Phe | Thr | His | Phe | Ile | Glu | Val | Ser | Ala | His | Pro | Val | Leu | Thr | Met |
| | 835 | | | | | | 840 | | | | | 845 | | | |
| Thr | Leu | Pro | Glu | Thr | Val | Thr | Gly | Leu | Gly | Thr | Leu | Arg | Arg | Glu | Gln |
| | 850 | | | | | 855 | | | | | 860 | | | | |
| Gly | Gly | Gln | Glu | Arg | Leu | Val | Thr | Ser | Leu | Ala | Glu | Ala | Trp | Thr | Asn |
| 865 | | | | | 870 | | | | | 875 | | | | | 880 |
| Gly | Leu | Thr | Ile | Asp | Trp | Ala | Pro | Val | Leu | Pro | Thr | Ala | Thr | Gly | His |
| | | | 885 | | | | | | 890 | | | | | 895 | |
| His | Pro | Glu | Leu | Pro | Thr | Tyr | Ala | Phe | Gln | Arg | Arg | His | Tyr | Trp | Leu |
| | | 900 | | | | | | 905 | | | | | 910 | | |
| His | Asp | Ser | Pro | Ala | Val | Gln | Gly | Ser | Val | Gln | Asp | Ser | Trp | Arg | Tyr |
| | | 915 | | | | | 920 | | | | | | 925 | | |

| | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Arg | Ile | Asp | Trp | Lys | Arg | Leu | Ala | Val | Ala | Asp | Ala | Ser | Glu | Arg | Ala |
| 930 | | | | | | 935 | | | | | 940 | | | | |
| Gly | Leu | Ser | Gly | Arg | Trp | Leu | Val | Val | Val | Pro | Glu | Asp | Arg | Ser | Ala |
| 945 | | | | | 950 | | | | | 955 | | | | | 960 |
| Glu | Ala | Ala | Pro | Val | Leu | Ala | Ala | Leu | Ser | Gly | Ala | Gly | Ala | Asp | Pro |
| | | | | 965 | | | | | 970 | | | | | 975 | |
| Val | Gln | Leu | Asp | Val | Ser | Pro | Leu | Gly | Asp | Arg | Gln | Arg | Leu | Ala | Ala |
| | | | 980 | | | | | 985 | | | | | 990 | | |
| Thr | Leu | Gly | Glu | Ala | Leu | Ala | Ala | Ala | Gly | Gly | Ala | Val | Asp | Gly | Val |
| | | 995 | | | | | 1000 | | | | | 1005 | | | |
| Leu | Ser | Leu | Leu | Ala | Trp | Asp | Glu | Ser | Ala | His | Pro | Gly | His | Pro | Ala |
| | 1010 | | | | | 1015 | | | | | 1020 | | | | |
| Pro | Phe | Thr | Arg | Gly | Thr | Gly | Ala | Thr | Leu | Thr | Leu | Val | Gln | Ala | Leu |
| 1025 | | | | | 1030 | | | | | 1035 | | | | | 1040 |
| Glu | Asp | Ala | Gly | Val | Ala | Ala | Pro | Leu | Trp | Cys | Val | Thr | His | Gly | Ala |
| | | | | 1045 | | | | | 1050 | | | | | 1055 | |
| Val | Ser | Val | Gly | Arg | Ala | Asp | His | Val | Thr | Ser | Pro | Ala | Gln | Ala | Met |
| | | | 1060 | | | | | 1065 | | | | | 1070 | | |
| Val | Trp | Gly | Met | Gly | Arg | Val | Ala | Ala | Leu | Glu | His | Pro | Glu | Arg | Trp |
| | 1075 | | | | | | 1080 | | | | | 1085 | | | |
| Gly | Gly | Leu | Ile | Asp | Leu | Pro | Ser | Asp | Ala | Asp | Arg | Ala | Ala | Leu | Asp |
| | 1090 | | | | | 1095 | | | | | 1100 | | | | |
| Arg | Met | Thr | Thr | Val | Leu | Ala | Gly | Gly | Thr | Gly | Glu | Asp | Gln | Val | Ala |
| 1105 | | | | | 1110 | | | | | 1115 | | | | | 1120 |
| Val | Arg | Ala | Ser | Gly | Leu | Leu | Ala | Arg | Arg | Leu | Val | Arg | Ala | Ser | Leu |
| | | | | 1125 | | | | | 1130 | | | | | 1135 | |
| Pro | Ala | His | Gly | Thr | Ala | Ser | Pro | Trp | Trp | Gln | Ala | Asp | Gly | Thr | Val |
| | | | 1140 | | | | | 1145 | | | | | 1150 | | |
| Leu | Val | Thr | Gly | Ala | Glu | Glu | Pro | Ala | Ala | Ala | Glu | Ala | Ala | Arg | Arg |
| | | 1155 | | | | | | 1160 | | | | 1165 | | | |
| Leu | Ala | Arg | Asp | Gly | Ala | Gly | His | Leu | Leu | Leu | His | Thr | Thr | Pro | Ser |
| | 1170 | | | | | 1175 | | | | | 1180 | | | | |
| Gly | Ser | Glu | Gly | Ala | Glu | Gly | Thr | Ser | Gly | Ala | Ala | Glu | Asp | Ser | Gly |
| 1185 | | | | | 1190 | | | | | 1195 | | | | | 1200 |
| Leu | Ala | Gly | Leu | Val | Ala | Glu | Leu | Ala | Asp | Leu | Gly | Ala | Thr | Ala | Thr |
| | | | | 1205 | | | | | 1210 | | | | | 1215 | |
| Val | Val | Thr | Cys | Asp | Leu | Thr | Asp | Ala | Glu | Ala | Ala | Ala | Arg | Leu | Leu |
| | | | 1220 | | | | | 1225 | | | | | 1230 | | |
| Ala | Gly | Val | Ser | Asp | Ala | His | Pro | Leu | Ser | Ala | Val | Leu | His | Leu | Pro |
| | | 1235 | | | | | 1240 | | | | | 1245 | | | |
| Pro | Thr | Val | Asp | Ser | Glu | Pro | Leu | Ala | Ala | Thr | Asp | Ala | Asp | Ala | Leu |
| | 1250 | | | | | 1255 | | | | | 1260 | | | | |
| Ala | Arg | Val | Val | Thr | Ala | Lys | Ala | Thr | Ala | Ala | Leu | His | Leu | Asp | Arg |
| 1265 | | | | | 1270 | | | | | 1275 | | | | | 1280 |
| Leu | Leu | Arg | Glu | Ala | Ala | Ala | Ala | Gly | Gly | Arg | Pro | Pro | Val | Leu | Val |
| | | | | 1285 | | | | | 1290 | | | | | 1295 | |
| Leu | Phe | Ser | Ser | Val | Ala | Ala | Ile | Trp | Gly | Gly | Ala | Gly | Gln | Gly | Ala |
| | | | 1300 | | | | | 1305 | | | | | 1310 | | |
| Tyr | Ala | Ala | Gly | Thr | Ala | Phe | Leu | Asp | Ala | Leu | Ala | Gly | Gln | His | Arg |
| | 1315 | | | | | | 1320 | | | | | 1325 | | | |
| Ala | Asp | Gly | Pro | Thr | Val | Thr | Ser | Val | Ala | Trp | Ser | Pro | Trp | Glu | Gly |
| | 1330 | | | | | 1335 | | | | | 1340 | | | | |
| Ser | Arg | Val | Thr | Glu | Gly | Ala | Thr | Gly | Glu | Arg | Leu | Arg | Arg | Leu | Gly |
| 1345 | | | | | 1350 | | | | | 1355 | | | | | 1360 |
| Leu | Arg | Pro | Leu | Ala | Pro | Ala | Thr | Ala | Leu | Thr | Ala | Leu | Asp | Thr | Ala |
| | | | | 1365 | | | | | 1370 | | | | | 1375 | |
| Leu | Gly | His | Gly | Asp | Thr | Ala | Val | Thr | Ile | Ala | Asp | Val | Asp | Trp | Ser |
| | | 1380 | | | | | | 1385 | | | | | 1390 | | |
| Ser | Phe | Ala | Pro | Gly | Phe | Thr | Thr | Ala | Arg | Pro | Gly | Thr | Leu | Leu | Ala |
| | 1395 | | | | | | 1400 | | | | | 1405 | | | |
| Asp | Leu | Pro | Glu | Ala | Arg | Arg | Ala | Leu | Asp | Glu | Gln | Gln | Ser | Thr | Thr |
| | 1410 | | | | | 1415 | | | | | 1420 | | | | |

| | | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| Ala | Ala | Asp | Asp | Thr | Val | Leu | Ser | Arg | Glu | Leu | Gly | Ala | Leu | Thr | Gly | |
| 1425 | | | | | 1430 | | | | | 1435 | | | | | 1440 | |
| Ala | Glu | Gln | Gln | Arg | Arg | Met | Gln | Glu | Leu | Val | Arg | Glu | His | Leu | Ala | |
| | | | | 1445 | | | | | 1450 | | | | | 1455 | | |
| Val | Val | Leu | Asn | His | Pro | Ser | Pro | Glu | Ala | Val | Asp | Thr | Gly | Arg | Ala | |
| | | 1460 | | | | | | 1465 | | | | | 1470 | | | |
| Phe | Arg | Asp | Leu | Gly | Phe | Asp | Ser | Leu | Thr | Ala | Val | Glu | Leu | Arg | Asn | |
| | 1475 | | | | | 1480 | | | | | | 1485 | | | | |
| Arg | Leu | Lys | Asn | Ala | Thr | Gly | Leu | Ala | Leu | Pro | Ala | Thr | Leu | Val | Phe | |
| | 1490 | | | | | 1495 | | | | | 1500 | | | | | |
| Asp | Tyr | Pro | Thr | Pro | Arg | Thr | Leu | Ala | Glu | Phe | Leu | Leu | Ala | Glu | Ile | |
| 1505 | | | | | 1510 | | | | | 1515 | | | | | 1520 | |
| Leu | Gly | Glu | Gln | Ala | Gly | Ala | Gly | Glu | Gln | Leu | Pro | Val | Asp | Gly | Gly | |
| | | | 1525 | | | | | 1530 | | | | | | 1535 | | |
| Val | Asp | Asp | Glu | Pro | Val | Ala | Ile | Val | Gly | Met | Ala | Cys | Arg | Leu | Pro | |
| | | 1540 | | | | | | 1545 | | | | | 1550 | | | |
| Gly | Gly | Val | Ala | Ser | Pro | Glu | Asp | Leu | Trp | Arg | Leu | Val | Ala | Gly | Gly | |
| | 1555 | | | | | | 1560 | | | | | 1565 | | | | |
| Glu | Asp | Ala | Ile | Ser | Gly | Phe | Pro | Gln | Asp | Arg | Gly | Trp | Asp | Val | Glu | |
| | 1570 | | | | 1575 | | | | | 1580 | | | | | | |
| Gly | Leu | Tyr | Asp | Pro | Asp | Pro | Asp | Ala | Ser | Gly | Arg | Thr | Tyr | Cys | Arg | |
| 1585 | | | | 1590 | | | | | | 1595 | | | | | 1600 | |
| Ala | Gly | Gly | Phe | Leu | Asp | Glu | Ala | Gly | Glu | Phe | Asp | Ala | Asp | Phe | Phe | |
| | | | 1605 | | | | | 1610 | | | | | | 1615 | | |
| Gly | Ile | Ser | Pro | Arg | Glu | Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln | Arg | Leu | |
| | | 1620 | | | | | | 1625 | | | | | 1630 | | | |
| Leu | Leu | Glu | Thr | Ser | Trp | Glu | Ala | Val | Glu | Asp | Ala | Gly | Ile | Asp | Pro | |
| | 1635 | | | | | 1640 | | | | | | 1645 | | | | |
| Thr | Ser | Leu | Gln | Gly | Gln | Gln | Val | Gly | Val | Phe | Ala | Gly | Thr | Asn | Gly | |
| | 1650 | | | | 1655 | | | | | | 1660 | | | | | |
| Pro | His | Tyr | Glu | Pro | Leu | Leu | Arg | Asn | Thr | Ala | Glu | Asp | Leu | Glu | Gly | |
| 1665 | | | | 1670 | | | | | | 1675 | | | | | 1680 | |
| Tyr | Val | Gly | Thr | Gly | Asn | Ala | Ala | Ser | Ile | Met | Ser | Gly | Arg | Val | Ser | |
| | | 1685 | | | | | | 1690 | | | | | | 1695 | | |
| Tyr | Thr | Leu | Gly | Leu | Glu | Gly | Pro | Ala | Val | Thr | Val | Asp | Thr | Ala | Cys | |
| | 1700 | | | | | | 1705 | | | | | | 1710 | | | |
| Ser | Ser | Ser | Leu | Val | Ala | Leu | His | Leu | Ala | Val | Gln | Ala | Leu | Arg | Lys | |
| | 1715 | | | | | 1720 | | | | | | 1725 | | | | |
| Gly | Glu | Cys | Gly | Leu | Ala | Leu | Ala | Gly | Gly | Val | Thr | Val | Met | Ser | Thr | |
| | 1730 | | | | | 1735 | | | | 1740 | | | | | | |
| Pro | Thr | Thr | Phe | Val | Glu | Phe | Ser | Arg | Gln | Arg | Gly | Leu | Ala | Glu | Asp | |
| 1745 | | | | | 1750 | | | | | 1755 | | | | | 1760 | |
| Gly | Arg | Ser | Lys | Ala | Phe | Ala | Ala | Ser | Ala | Asp | Gly | Phe | Gly | Pro | Ala | |
| | | | 1765 | | | | | 1770 | | | | | | 1775 | | |
| Glu | Gly | Val | Gly | Met | Leu | Leu | Val | Glu | Arg | Leu | Ser | Asp | Ala | Arg | Arg | |
| | 1780 | | | | | | | 1785 | | | | | 1790 | | | |
| Asn | Gly | His | Arg | Val | Leu | Ala | Val | Val | Arg | Gly | Ser | Ala | Val | Asn | Gln | |
| | 1795 | | | | | 1800 | | | | | | 1805 | | | | |
| Asp | Gly | Ala | Ser | Asn | Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | Ser | Gln | Gln | |
| | 1810 | | | | 1815 | | | | | | 1820 | | | | | |
| Arg | Val | Ile | Arg | Arg | Ala | Leu | Ala | Asp | Ala | Arg | Leu | Thr | Thr | Ala | Asp | |
| 1825 | | | | | 1830 | | | | | 1835 | | | | | 1840 | |
| Val | Asp | Val | Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Arg | Leu | Gly | Asp | Pro | |
| | | | 1845 | | | | | 1850 | | | | | | 1855 | | |
| Ile | Glu | Ala | Gln | Ala | Leu | Ile | Ala | Thr | Tyr | Gly | Gln | Gly | Arg | Asp | Thr | |
| | | 1860 | | | | | | 1865 | | | | | 1870 | | | |
| Glu | Gln | Pro | Leu | Arg | Leu | Gly | Ser | Leu | Lys | Ser | Asn | Ile | Gly | His | Thr | |
| | 1875 | | | | | 1880 | | | | | | 1885 | | | | |
| Gln | Ala | Ala | Ala | Gly | Val | Ser | Gly | Ile | Ile | Lys | Met | Val | Gln | Ala | Met | |
| | 1890 | | | | | 1895 | | | | | | 1900 | | | | |
| Arg | His | Gly | Val | Leu | Pro | Lys | Thr | Leu | His | Val | Asp | Arg | Pro | Ser | Asp | |
| 1905 | | | | | 1910 | | | | | 1915 | | | | | 1920 | |

| | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Gln | Ile | Asp | Trp | Ser | Ala | Gly | Thr | Val | Glu | Leu | Leu | Thr | Glu | Ala | Met |
| | | | | 1925 | | | | | 1930 | | | | | 1935 | |
| Asp | Trp | Pro | Arg | Lys | Gln | Glu | Gly | Gly | Leu | Arg | Arg | Ala | Ala | Val | Ser |
| | | | 1940 | | | | | 1945 | | | | | 1950 | | |
| Ser | Phe | Gly | Ile | Ser | Gly | Thr | Asn | Ala | His | Ile | Val | Leu | Glu | Glu | Ala |
| | | 1955 | | | | 1960 | | | | | | 1965 | | | |
| Pro | Val | Asp | Glu | Asp | Ala | Pro | Ala | Asp | Glu | Pro | Ser | Val | Gly | Gly | Val |
| | 1970 | | | | 1975 | | | | | | 1980 | | | | |
| Val | Pro | Trp | Leu | Val | Ser | Ala | Lys | Thr | Pro | Ala | Ala | Leu | Asp | Ala | Gln |
| 1985 | | | | 1990 | | | | | | 1995 | | | | | 2000 |
| Ile | Gly | Arg | Leu | Ala | Ala | Phe | Ala | Ser | Gln | Gly | Arg | Thr | Asp | Ala | Ala |
| | | | 2005 | | | | | | 2010 | | | | 2015 | | |
| Asp | Pro | Gly | Ala | Val | Ala | Arg | Val | Leu | Ala | Gly | Gly | Arg | Ala | Gln | Phe |
| | | 2020 | | | | | | 2025 | | | | | 2030 | | |
| Glu | His | Arg | Ala | Val | Ala | Leu | Gly | Thr | Gly | Gln | Asp | Asp | Leu | Ala | Ala |
| | | 2035 | | | | | 2040 | | | | | 2045 | | | |
| Ala | Leu | Ala | Ala | Pro | Glu | Gly | Leu | Val | Arg | Gly | Val | Ala | Ser | Gly | Val |
| | 2050 | | | | | 2055 | | | | | 2060 | | | | |
| Gly | Arg | Val | Ala | Phe | Val | Phe | Pro | Gly | Gln | Gly | Thr | Gln | Trp | Ala | Gly |
| 2065 | | | | 2070 | | | | | | 2075 | | | | | 2080 |
| Met | Gly | Ala | Glu | Leu | Leu | Asp | Val | Ser | Lys | Glu | Phe | Ala | Ala | Ala | Met |
| | | | 2085 | | | | | | 2090 | | | | | 2095 | |
| Ala | Glu | Cys | Glu | Ala | Ala | Leu | Ala | Pro | Tyr | Val | Asp | Trp | Ser | Leu | Glu |
| | | 2100 | | | | | | 2105 | | | | | 2110 | | |
| Ala | Val | Val | Arg | Gln | Ala | Pro | Gly | Ala | Pro | Thr | Leu | Glu | Arg | Val | Asp |
| | | 2115 | | | | | 2120 | | | | | 2125 | | | |
| Val | Val | Gln | Pro | Val | Thr | Phe | Ala | Val | Met | Val | Ser | Leu | Ala | Lys | Val |
| | 2130 | | | | | 2135 | | | | | 2140 | | | | |
| Trp | Gln | His | His | Gly | Val | Thr | Pro | Gln | Ala | Val | Val | Gly | His | Ser | Gln |
| 2145 | | | | 2150 | | | | | | 2155 | | | | | 2160 |
| Gly | Glu | Ile | Ala | Ala | Ala | Tyr | Val | Ala | Gly | Ala | Leu | Ser | Leu | Asp | Asp |
| | | | 2165 | | | | | | 2170 | | | | | 2175 | |
| Ala | Ala | Arg | Val | Val | Thr | Leu | Arg | Ser | Lys | Ser | Ile | Gly | Ala | His | Leu |
| | | 2180 | | | | | | 2185 | | | | | 2190 | | |
| Ala | Gly | Gln | Gly | Gly | Met | Leu | Ser | Leu | Ala | Leu | Ser | Glu | Ala | Ala | Val |
| | 2195 | | | | | 2200 | | | | | | 2205 | | | |
| Val | Glu | Arg | Leu | Ala | Gly | Phe | Asp | Gly | Leu | Ser | Val | Ala | Ala | Val | Asn |
| | 2210 | | | | | 2215 | | | | | 2220 | | | | |
| Gly | Pro | Thr | Ala | Thr | Val | Val | Ser | Gly | Asp | Pro | Thr | Gln | Ile | Gln | Glu |
| 2225 | | | | 2230 | | | | | | 2235 | | | | | 2240 |
| Leu | Ala | Gln | Ala | Cys | Glu | Ala | Asp | Gly | Val | Arg | Ala | Arg | Ile | Ile | Pro |
| | | | 2245 | | | | | | 2250 | | | | | 2255 | |
| Val | Asp | Tyr | Ala | Ser | His | Ser | Ala | His | Val | Glu | Thr | Ile | Glu | Ser | Glu |
| | | 2260 | | | | | | 2265 | | | | | 2270 | | |
| Leu | Ala | Asp | Val | Leu | Ala | Gly | Leu | Ser | Pro | Gln | Thr | Pro | Gln | Val | Pro |
| | 2275 | | | | | | 2280 | | | | | 2285 | | | |
| Phe | Phe | Ser | Thr | Leu | Glu | Gly | Ala | Trp | Ile | Thr | Glu | Pro | Ala | Leu | Asp |
| | 2290 | | | | | 2295 | | | | | 2300 | | | | |
| Gly | Gly | Tyr | Trp | Tyr | Arg | Asn | Leu | Arg | His | Arg | Val | Gly | Phe | Ala | Pro |
| 2305 | | | | 2310 | | | | | | 2315 | | | | | 2320 |
| Ala | Val | Glu | Thr | Leu | Ala | Thr | Asp | Glu | Gly | Phe | Thr | His | Phe | Val | Glu |
| | | | 2325 | | | | | | 2330 | | | | | 2335 | |
| Val | Ser | Ala | His | Pro | Val | Leu | Thr | Met | Ala | Leu | Pro | Glu | Thr | Val | Thr |
| | | 2340 | | | | | | 2345 | | | | | 2350 | | |
| Gly | Leu | Gly | Thr | Leu | Arg | Arg | Asp | Asn | Gly | Gly | Gln | His | Arg | Leu | Thr |
| | 2355 | | | | | | 2360 | | | | | 2365 | | | |
| Thr | Ser | Leu | Ala | Glu | Ala | Trp | Ala | Asn | Gly | Leu | Thr | Val | Asp | Trp | Ala |
| | 2370 | | | | | 2375 | | | | | 2380 | | | | |
| Ser | Leu | Leu | Pro | Thr | Thr | Thr | Thr | His | Pro | Asp | Leu | Pro | Thr | Tyr | Ala |
| 2385 | | | | 2390 | | | | | | 2395 | | | | | 2400 |
| Phe | Gln | Thr | Glu | Arg | Tyr | Trp | Pro | Gln | Pro | Asp | Leu | Ser | Ala | Ala | Gly |
| | | | 2405 | | | | | | 2410 | | | | | 2415 | |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Asp | Ile | Thr | Ser | Ala | Gly | Leu | Gly | Ala | Ala | Glu | His | Pro | Leu | Leu | Gly | 2420 | 2425 | 2430 |
| Ala | Ala | Val | Ala | Leu | Ala | Asp | Ser | Asp | Gly | Cys | Leu | Leu | Thr | Gly | Ser | 2435 | 2440 | 2445 |
| Leu | Ser | Leu | Arg | Thr | His | Pro | Trp | Leu | Ala | Asp | His | Ala | Val | Ala | Gly | 2450 | 2455 | 2460 |
| Thr | Val | Leu | Leu | Pro | Gly | Thr | Ala | Phe | Val | Glu | Leu | Ala | Phe | Arg | Ala | 2465 | 2470 | 2475 |
| Gly | Asp | Gln | Val | Gly | Cys | Asp | Leu | Val | Glu | Glu | Leu | Thr | Leu | Asp | Ala | 2485 | 2490 | 2495 |
| Pro | Leu | Val | Leu | Pro | Arg | Arg | Gly | Ala | Val | Arg | Val | Gln | Leu | Ser | Val | 2500 | 2505 | 2510 |
| Gly | Ala | Ser | Asp | Glu | Ser | Gly | Arg | Arg | Thr | Phe | Gly | Leu | Tyr | Ala | His | 2515 | 2520 | 2525 |
| Pro | Glu | Asp | Ala | Pro | Gly | Glu | Ala | Glu | Trp | Thr | Arg | His | Ala | Thr | Gly | 2530 | 2535 | 2540 |
| Val | Leu | Ala | Ala | Arg | Ala | Asp | Arg | Thr | Ala | Pro | Val | Ala | Asp | Pro | Glu | 2545 | 2550 | 2555 |
| Ala | Trp | Pro | Pro | Pro | Gly | Ala | Glu | Pro | Val | Asp | Val | Asp | Gly | Leu | Tyr | 2565 | 2570 | 2575 |
| Glu | Arg | Phe | Ala | Ala | Asn | Gly | Tyr | Gly | Tyr | Gly | Pro | Leu | Phe | Gln | Gly | 2580 | 2585 | 2590 |
| Val | Arg | Gly | Val | Trp | Arg | Arg | Gly | Asp | Glu | Val | Phe | Ala | Asp | Val | Ala | 2595 | 2600 | 2605 |
| Leu | Pro | Ala | Glu | Val | Ala | Gly | Ala | Glu | Gly | Ala | Arg | Phe | Gly | Leu | His | 2610 | 2615 | 2620 |
| Pro | Ala | Leu | Leu | Asp | Ala | Ala | Val | Gln | Ala | Ala | Gly | Ala | Gly | Arg | Gly | 2625 | 2630 | 2635 |
| Val | Arg | Arg | Gly | His | Ala | Ala | Ala | Val | Arg | Leu | Glu | Arg | Asp | Leu | Leu | 2645 | 2650 | 2655 |
| Tyr | Ala | Val | Gly | Ala | Thr | Ala | Leu | Arg | Val | Arg | Leu | Ala | Pro | Ala | Gly | 2660 | 2665 | 2670 |
| Pro | Asp | Thr | Val | Ser | Val | Ser | Ala | Ala | Asp | Ser | Ser | Gly | Gln | Pro | Val | 2675 | 2680 | 2685 |
| Phe | Ala | Ala | Asp | Ser | Leu | Thr | Val | Leu | Pro | Val | Asp | Pro | Ala | Gln | Leu | 2690 | 2695 | 2700 |
| Ala | Ala | Phe | Ser | Asp | Pro | Thr | Leu | Asp | Ala | Leu | His | Leu | Leu | Glu | Trp | 2705 | 2710 | 2715 |
| Thr | Ala | Trp | Asp | Gly | Ala | Ala | Gln | Ala | Leu | Pro | Gly | Ala | Val | Val | Leu | 2725 | 2730 | 2735 |
| Gly | Gly | Asp | Ala | Asp | Gly | Leu | Ala | Ala | Ala | Leu | Arg | Ala | Gly | Gly | Thr | 2740 | 2745 | 2750 |
| Glu | Val | Leu | Ser | Phe | Pro | Asp | Leu | Thr | Asp | Leu | Val | Glu | Ala | Val | Asp | 2755 | 2760 | 2765 |
| Arg | Gly | Glu | Thr | Pro | Ala | Pro | Ala | Thr | Val | Leu | Val | Ala | Cys | Pro | Ala | 2770 | 2775 | 2780 |
| Ala | Gly | Pro | Asp | Gly | Pro | Glu | His | Val | Arg | Glu | Ala | Leu | His | Gly | Ser | 2785 | 2790 | 2795 |
| Leu | Ala | Leu | Met | Gln | Ala | Trp | Leu | Ala | Asp | Glu | Arg | Phe | Thr | Asp | Gly | 2805 | 2810 | 2815 |
| Arg | Leu | Val | Leu | Val | Thr | Arg | Asp | Ala | Val | Ala | Ala | Arg | Ser | Gly | Asp | 2820 | 2825 | 2830 |
| Gly | Leu | Arg | Ser | Thr | Gly | Gln | Ala | Ala | Val | Trp | Gly | Leu | Gly | Arg | Ser | 2835 | 2840 | 2845 |
| Ala | Gln | Thr | Glu | Ser | Pro | Gly | Arg | Phe | Val | Leu | Leu | Asp | Leu | Ala | Gly | 2850 | 2855 | 2860 |
| Glu | Ala | Arg | Thr | Ala | Gly | Asp | Ala | Thr | Ala | Gly | Asp | Gly | Leu | Thr | Thr | 2865 | 2870 | 2875 |
| Gly | Asp | Ala | Thr | Val | Gly | Gly | Thr | Ser | Gly | Asp | Ala | Ala | Leu | Gly | Ser | 2885 | 2890 | 2895 |
| Ala | Leu | Ala | Thr | Ala | Leu | Gly | Ser | Gly | Glu | Pro | Gln | Leu | Ala | Leu | Arg | 2900 | 2905 | 2910 |

Asp Gly Ala Leu Leu Val Pro Arg Leu Ala Arg Ala Ala Ala Pro Ala
 2915 2920 2925
 Ala Ala Asp Gly Leu Ala Ala Asp Gly Leu Ala Ala Leu Pro Leu
 2930 2935 2940
 Pro Ala Ala Pro Ala Leu Trp Arg Leu Glu Pro Gly Thr Asp Gly Ser
 2945 2950 2955 2960
 Leu Glu Ser Leu Thr Ala Ala Pro Gly Asp Ala Glu Thr Leu Ala Pro
 2965 2970 2975
 Glu Pro Leu Gly Pro Gly Gln Val Arg Ile Ala Ile Arg Ala Thr Gly
 2980 2985 2990
 Leu Asn Phe Arg Asp Val Leu Ile Ala Leu Gly Met Tyr Pro Asp Pro
 2995 3000 3005
 Ala Leu Met Gly Thr Glu Gly Ala Gly Val Val Thr Ala Thr Gly Pro
 3010 3015 3020
 Gly Val Thr His Leu Ala Pro Gly Asp Arg Val Met Gly Leu Leu Ser
 3025 3030 3035 3040
 Gly Ala Tyr Ala Pro Val Val Val Ala Asp Ala Arg Thr Val Ala Arg
 3045 3050 3055
 Met Pro Glu Gly Trp Thr Phe Ala Gln Gly Ala Ser Val Pro Val Val
 3060 3065 3070
 Phe Leu Thr Ala Val Tyr Ala Leu Arg Asp Leu Ala Asp Val Lys Pro
 3075 3080 3085
 Gly Glu Arg Leu Leu Val His Ser Ala Ala Gly Gly Val Gly Met Ala
 3090 3095 3100
 Ala Val Gln Leu Ala Arg His Trp Gly Val Glu Val His Gly Thr Ala
 3105 3110 3115 3120
 Ser His Gly Lys Trp Asp Ala Leu Arg Ala Leu Gly Leu Asp Asp Ala
 3125 3130 3135
 His Ile Ala Ser Ser Arg Thr Leu Asp Phe Glu Ser Ala Phe Arg Ala
 3140 3145 3150
 Ala Ser Gly Gly Ala Gly Met Asp Val Val Leu Asn Ser Leu Ala Arg
 3155 3160 3165
 Glu Phe Val Asp Ala Ser Leu Arg Leu Leu Gly Pro Gly Gly Arg Phe
 3170 3175 3180
 Val Glu Met Gly Lys Thr Asp Val Arg Asp Ala Glu Arg Val Ala Ala
 3185 3190 3195 3200
 Asp His Pro Gly Val Gly Tyr Arg Ala Phe Asp Leu Gly Glu Ala Gly
 3205 3210 3215
 Pro Glu Arg Ile Gly Glu Met Leu Ala Glu Val Ile Ala Leu Phe Glu
 3220 3225 3230
 Asp Gly Val Leu Arg His Leu Pro Val Thr Thr Trp Asp Val Arg Arg
 3235 3240 3245
 Ala Arg Asp Ala Phe Arg His Val Ser Gln Ala Arg His Thr Gly Lys
 3250 3255 3260
 Val Val Leu Thr Met Pro Ser Gly Leu Asp Pro Glu Gly Thr Val Leu
 3265 3270 3275 3280
 Leu Thr Gly Gly Thr Gly Ala Leu Gly Gly Ile Val Ala Arg His Val
 3285 3290 3295
 Val Gly Glu Trp Gly Val Arg Arg Leu Leu Leu Val Ser Arg Arg Gly
 3300 3305 3310
 Thr Asp Ala Pro Gly Ala Gly Glu Leu Val His Glu Leu Glu Ala Leu
 3315 3320 3325
 Gly Ala Asp Val Ser Val Ala Ala Cys Asp Val Ala Asp Arg Glu Ala
 3330 3335 3340
 Leu Thr Ala Val Leu Asp Ser Ile Pro Ala Glu His Pro Leu Thr Ala
 3345 3350 3355 3360
 Val Val His Thr Ala Gly Val Leu Ser Asp Gly Thr Leu Pro Ser Met
 3365 3370 3375
 Thr Ala Glu Asp Val Glu His Val Leu Arg Pro Lys Val Asp Ala Ala
 3380 3385 3390
 Phe Leu Leu Asp Glu Leu Thr Ser Thr Pro Gly Tyr Asp Leu Ala Ala
 3395 3400 3405

Phe Val Met Phe Ser Ser Ala Ala Ala Val Phe Gly Gly Ala Gly Gln
 3410 3415 3420
 Gly Ala Tyr Ala Ala Ala Asn Ala Thr Leu Asp Ala Leu Ala Trp Arg
 3425 3430 3435 3440
 Arg Arg Thr Ala Gly Leu Pro Ala Leu Ser Leu Gly Trp Gly Leu Trp
 3445 3450 3455
 Ala Glu Thr Ser Gly Met Thr Gly Gly Leu Ser Asp Thr Asp Arg Ser
 3460 3465 3470
 Arg Leu Ala Arg Ser Gly Ala Thr Pro Met Asp Ser Glu Leu Thr Leu
 3475 3480 3485
 Ser Leu Leu Asp Ala Ala Met Arg Arg Asp Asp Pro Ala Leu Val Pro
 3490 3495 3500
 Ile Ala Leu Asp Val Ala Ala Leu Arg Ala Gln Gln Arg Asp Gly Met
 3505 3510 3515 3520
 Leu Ala Pro Leu Leu Ser Gly Leu Thr Arg Gly Ser Arg Val Gly Gly
 3525 3530 3535
 Ala Pro Val Asn Gln Arg Arg Ala Ala Ala Gly Gly Ala Gly Glu Ala
 3540 3545 3550
 Asp Thr Asp Leu Gly Gly Arg Leu Ala Ala Met Thr Pro Asp Asp Arg
 3555 3560 3565
 Val Ala His Leu Arg Asp Leu Val Arg Thr His Val Ala Thr Val Leu
 3570 3575 3580
 Gly His Gly Thr Pro Ser Arg Val Asp Leu Glu Arg Ala Phe Arg Asp
 3585 3590 3595 3600
 Thr Gly Phe Asp Ser Leu Thr Ala Val Glu Leu Arg Asn Arg Leu Asn
 3605 3610 3615
 Ala Ala Thr Gly Leu Arg Leu Pro Ala Thr Leu Val Phe Asp His Pro
 3620 3625 3630
 Thr Pro Gly Glu Leu Ala Gly His Leu Leu Asp Glu Leu Ala Thr Ala
 3635 3640 3645
 Ala Gly Gly Ser Trp Ala Glu Gly Thr Gly Ser Gly Asp Thr Ala Ser
 3650 3655 3660
 Ala Thr Asp Arg Gln Thr Thr Ala Ala Leu Ala Glu Leu Asp Arg Leu
 3665 3670 3675 3680
 Glu Gly Val Leu Ala Ser Leu Ala Pro Ala Ala Gly Gly Arg Pro Glu
 3685 3690 3695
 Leu Ala Ala Arg Leu Arg Ala Leu Ala Ala Leu Gly Asp Asp Gly
 3700 3705 3710
 Asp Asp Ala Thr Asp Leu Asp Glu Ala Ser Asp Asp Asp Leu Phe Ser
 3715 3720 3725
 Phe Ile Asp Lys Glu Leu Gly Asp Ser Asp Phe
 3730 3735

<210> 34

<211> 4689

<212> DNA

<213> *Streptomyces venezuelae*

<400> 34

| | | | | | | |
|-------------|------------|------------|------------|------------|-------------|-----|
| atggcgaaaca | acgaagacaa | gctccgcgac | tacctcaagc | gcgtcaccgc | cgagctgcag | 60 |
| cagaacacca | ggcgtctgcg | cgagatcgag | ggacgcacgc | acgagccggt | ggcgatcgtg | 120 |
| ggcatggcct | gccgcctgcc | gggcggtgtc | gcctcgcccc | aggacctgtg | gcagctgggtg | 180 |
| gccggggacg | gggacgcgat | ctcggagttc | ccgcaggacc | gcggtctgga | cgtggagggg | 240 |
| ctgtacgacc | ccgaccgga | cgcgtccggc | aggacgtact | gccgggtccg | cggattcctg | 300 |
| cacgacgccg | gcgagttcga | cgccgacttc | ttcgggatct | cgccgcgcga | ggccctcgcc | 360 |
| atggaccgcg | agcagcgact | gtccctcacc | accgcgtggg | aggcgatcga | gagcgcgggc | 420 |
| atcgacccga | cggccctgaa | gggcagcggc | ctcggcgctc | tcgtcggcgg | ctggcacacc | 480 |
| ggctacacct | cggggcagac | caccgccgtg | cagtcgcccc | agctggaggg | ccacctgggtc | 540 |
| agcggcgcg | cgctgggctt | cctgtccggc | cgtatcgctg | acgtcctcgg | tacggacgga | 600 |
| ccggccctga | ccgtggacac | ggcctgctcg | tcctcgctgg | tcgccctgca | cctcgccgtg | 660 |
| caggccctcc | gcaagggcga | gtgcgacatg | gccctcgccg | gtggtgtcac | ggcatgccc | 720 |
| aacgcggacc | tggtcgtgca | gttcagccgg | cagcgcgggc | tggccgcgga | cggccggctg | 780 |

| | | | | | | |
|-------------|------------|-------------|------------|-------------|-------------|------|
| aaggcggttcg | ccacctcggc | ggacggcttc | ggcccccgcg | agggcgccgg | agtcctgctg | 840 |
| gtggagcgcc | tgtcggacgc | ccgccgcaac | ggacaccgga | tcctcgcggt | cgcccgcggc | 900 |
| agcgcggtca | accaggacgg | cgccagcaac | ggcctcacgg | ctccgcacgg | gccctcccag | 960 |
| cagcgcgtca | tccgacgggc | cctggcgga | ggccggctcg | cgccgggtga | cgtggacgtc | 1020 |
| gtcagggcgc | acggcacggg | cacgcggctc | ggcgaccgga | tcgaggcgca | ggccctcatc | 1080 |
| gccacctacg | gccaggagaa | gagcagcgaa | cagccgctga | ggctgggctc | gttgaagtcg | 1140 |
| aacatcgggc | acacgcaggc | cgcgcccggt | gtcgcagggt | tcacaaagat | ggtccaggcg | 1200 |
| atgcgccacg | gactgctgcc | gaagacgctg | cacgtcgacg | agccctcgga | ccagatcgac | 1260 |
| tggtcggcgg | gcacgggtga | actcctcacc | gaggccgtcg | actggccgga | gaagcaggac | 1320 |
| ggcgggctgc | gccgcgcggc | tgtctcctcc | ttcggcatca | gcgggacgaa | cgcgacgtc | 1380 |
| gtcctggagg | aggccccggc | ggtcgaggac | ttcccggccg | tcgagccgcc | ggccgggtgg | 1440 |
| ggtgtggtgc | cgtggcgggt | gtccgcgaag | actccggccg | cgctggacgc | ccagatcggg | 1500 |
| cagctcgccg | cgtacgcgga | cggtcgtacg | gacgtggatc | cgccgggtgg | cgcccgcgcc | 1560 |
| ctggtcgaca | gccgtacggc | gatggagcac | cgcgcggtcg | cggtcggcga | cagccgggag | 1620 |
| gactgcgggg | acgccctgcg | gatgccggaa | ggactggtac | gcggcacgtc | ctcgacgtg | 1680 |
| ggccgggtgg | cgttcgtctt | ccccggccag | ggcacgcagt | gggcccgcac | gggcccga | 1740 |
| ctccttgaca | gctcaccgga | gttcgctgcc | tcgatggccg | aatgcgagac | cgcgctctcc | 1800 |
| cgctacgtcg | actggtctct | tgaagccgtc | gtccgacagg | aaccggcgcc | accacgctc | 1860 |
| gaccgcgtcg | acgtcgtcca | gcccgtgacc | ttcgtctgca | tggctctcgt | ggcgaaggtc | 1920 |
| tggcagcacc | acggcatcac | ccccagggc | gtcgtcgccc | actcgacagg | cgagatcgcc | 1980 |
| gcgcgtacg | tcgcgggtgc | actcaccctc | gacgacggcg | cccgcgtcgt | caccctgcgc | 2040 |
| agcaagtcca | tcgcgcggca | cctcgccggc | aagggcggca | tgatctccct | cgccctcgac | 2100 |
| gaggcgggcg | tcctgaagcg | actgagcgac | ttcgacggac | ttccgtcgc | cgccgtcaac | 2160 |
| ggccccaccg | ccaccgtcgt | ctccggcgac | ccgaccgaga | tcgaggaact | cgcccgccac | 2220 |
| tgcgaggccg | acggcgtccg | tgcgcggatc | atcccggctg | actacgcctc | ccacagccgg | 2280 |
| caggctcgaga | tcacgcgaga | ggagctggcc | gaggtcctcg | ccggactcgc | cccgcaggct | 2340 |
| ccgcacgtgc | cgttcttctc | caccctcgaa | ggcacctgga | tcaccgagcc | ggtgctcgac | 2400 |
| ggcacctact | ggtaccgcaa | cctgcgccat | cgcggtgggt | tcgccccgc | cgtggagacc | 2460 |
| ttggcggttg | acggcttcac | ccacttcac | gaggtcagcg | cccaccccg | cctcaccatg | 2520 |
| accctccccg | agccctcgac | cggcctcgcc | accctcgcc | gcgaacagg | aggccaggag | 2580 |
| cgtctggtca | cctcactcgc | cgaagcctgg | gccaacggcc | tcaccatcga | ctgggcggcc | 2640 |
| atcctcccca | ccgcaaccgg | ccaccacccc | gagctcccca | cctacgcctt | ccagaccgag | 2700 |
| cgcttctggc | tgcagagctc | cgcgcccacc | agcgccggcg | acgactggcg | ttaccgcgtc | 2760 |
| gagtggaagc | cgctgacggc | ctccggccag | gcggacctgt | ccgggcggtg | gatcgctgcc | 2820 |
| gtcgggagcg | agccagaagc | cgagctgctg | ggcgcgctga | aggccgcggg | agcgagggtc | 2880 |
| gacgtactgg | aagccggggc | ggacgacgac | cgtgaggccc | tcgcccggcg | gctcaccgca | 2940 |
| ctgacgaccg | gcgacggctt | caccggcggt | gtctcgctcc | tcgacgacct | cgtgccacag | 3000 |
| gtcgtctggg | tgcaggcact | cggcgacggc | ggaatcaagg | cgccctgtg | gtccgtcacc | 3060 |
| cagggcgcgg | tctccgtcgg | acgtctcgac | accccgccg | accccgaccg | ggccatgctc | 3120 |
| tggggcctcg | gccgcgtcgt | cgcccttgag | cacccggaac | gctgggcccg | cctcgctcgac | 3180 |
| ctccccgccc | agcccgatgc | cgccgcctc | gcccacctcg | tcaccgcact | ctccggcgcc | 3240 |
| accggcgagg | accagatcgc | catccgcacc | accggactcc | acgcccggcg | cctcgcccgc | 3300 |
| gcacccctcc | acggacgtcg | gcccacccgc | gactggcagc | cccacggcac | cgctcctcatc | 3360 |
| accggcgggc | ccggagccct | cggcagccac | gccgcacgtc | ggatggccca | ccacggagcc | 3420 |
| gaacacctcc | tcctcgtcag | ccgcagcggc | gaacaagccc | ccggagccac | ccaactcacc | 3480 |
| gccgaactca | ccgcatcggg | cgcccgcgct | accatcgccg | cctgcgacgt | cgccgacccc | 3540 |
| cacgccatgc | gcacccctct | cgacgccatc | cccgccgaga | cgccctcac | cgccgtcgtc | 3600 |
| cacaccgccc | gcgcaccggg | cggcgatccg | ctggacgtca | ccggcccggg | ggacatcgcc | 3660 |
| cgcacccctg | gcgcgaagac | gagcggcgcc | gaggtcctcg | acgacctgct | ccgcggcact | 3720 |
| ccgctggacg | ccttcgtcct | ctactcctcg | aacgcggggg | tctggggcag | cggcagccag | 3780 |
| ggcgtctacg | cggcgggcaa | cgccacctc | gacgcgtcgc | ccgcccggcg | ccgcgcccgg | 3840 |
| ggcgagacgg | cgacctcggt | cgccgggggc | ctctggggcg | gcgacggcat | gggcccgggg | 3900 |
| gccgacgacg | cgtactggca | gcgtcgcggc | atccgtccga | tgagccccga | ccgcgcccctg | 3960 |
| gacgaactgg | ccaaggccct | gagccacgac | gagaccttcg | tcgccgtggc | cgatgtcgac | 4020 |
| tgggagcggt | tcgcgcccgc | gttcacgggt | ttccgtccca | gccttctgct | cgacggcgctc | 4080 |
| ccgagggccc | ggcaggcgct | cgccgcaccc | gtcggtgccc | cggctcccgg | cgacgcggcc | 4140 |
| gtggcgccga | ccgggcagtc | gtcggcgctg | gccgcgatca | ccgcgctccc | cgagcccagag | 4200 |
| cgccggccgg | cgctcctcac | cctcgctccgt | acccacgcgg | cgcccgctact | cggccattcc | 4260 |
| tccccgacc | gggtggcccc | cggccgtgcc | ttcaccgagc | tcggcttcga | ctcgctgacg | 4320 |
| gccgtgcagc | tccgcaacca | gctctccacg | gtggctcgga | acaggctccc | cgccaccacg | 4380 |
| gtcttcgacc | acccgacgcc | cgccgcactc | gccgcgcacc | tccacgaggc | gtacctcgca | 4440 |
| ccggccgagc | cggccccgac | ggactgggag | gggcgggtgc | gccgggccc | ggccgaactg | 4500 |

```

ccccctcgacc ggctgcggga cgcggggggtc ctgcacaccg tcctgcgcct caccggcatc 4560
gagccccgagc cgggttcctcg cggttcggac ggcggcgccg ccgaccctgg tgcggagccg 4620
gaggcgtcga tcgacgacct ggacgccgag gccctgatcc ggatggctct cggcccccgt 4680
aacacctga                                     4689

```

```

<210> 35
<211> 1562
<212> PRT
<213> Streptomyces venezuelae

```

```

<400> 35
Met Ala Asn Asn Glu Asp Lys Leu Arg Asp Tyr Leu Lys Arg Val Thr
 1           5           10           15
Ala Glu Leu Gln Gln Asn Thr Arg Arg Leu Arg Glu Ile Glu Gly Arg
           20           25           30
Thr His Glu Pro Val Ala Ile Val Gly Met Ala Cys Arg Leu Pro Gly
           35           40           45
Gly Val Ala Ser Pro Glu Asp Leu Trp Gln Leu Val Ala Gly Asp Gly
           50           55           60
Asp Ala Ile Ser Glu Phe Pro Gln Asp Arg Gly Trp Asp Val Glu Gly
65           70           75           80
Leu Tyr Asp Pro Asp Pro Asp Ala Ser Gly Arg Thr Tyr Cys Arg Ser
           85           90           95
Gly Gly Phe Leu His Asp Ala Gly Glu Phe Asp Ala Asp Phe Phe Gly
           100          105          110
Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Ser
           115          120          125
Leu Thr Thr Ala Trp Glu Ala Ile Glu Ser Ala Gly Ile Asp Pro Thr
           130          135          140
Ala Leu Lys Gly Ser Gly Leu Gly Val Phe Val Gly Gly Trp His Thr
145          150          155          160
Gly Tyr Thr Ser Gly Gln Thr Thr Ala Val Gln Ser Pro Glu Leu Glu
           165          170          175
Gly His Leu Val Ser Gly Ala Ala Leu Gly Phe Leu Ser Gly Arg Ile
           180          185          190
Ala Tyr Val Leu Gly Thr Asp Gly Pro Ala Leu Thr Val Asp Thr Ala
           195          200          205
Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala Leu Arg
           210          215          220
Lys Gly Glu Cys Asp Met Ala Leu Ala Gly Gly Val Thr Val Met Pro
225          230          235          240
Asn Ala Asp Leu Phe Val Gln Phe Ser Arg Gln Arg Gly Leu Ala Ala
           245          250          255
Asp Gly Arg Ser Lys Ala Phe Ala Thr Ser Ala Asp Gly Phe Gly Pro
           260          265          270
Ala Glu Gly Ala Gly Val Leu Leu Val Glu Arg Leu Ser Asp Ala Arg
           275          280          285
Arg Asn Gly His Arg Ile Leu Ala Val Val Arg Gly Ser Ala Val Asn
           290          295          300
Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro His Gly Pro Ser Gln
305          310          315          320
Gln Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Ala Pro Gly
           325          330          335
Asp Val Asp Val Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp
           340          345          350
Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Glu Lys Ser
           355          360          365
Ser Glu Gln Pro Leu Arg Leu Gly Ala Leu Lys Ser Asn Ile Gly His
           370          375          380
Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Gln Ala
385          390          395          400

```

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Arg | His | Gly | Leu | Leu | Pro | Lys | Thr | Leu | His | Val | Asp | Glu | Pro | Ser |
| | | | | 405 | | | | | 410 | | | | | 415 | |
| Asp | Gln | Ile | Asp | Trp | Ser | Ala | Gly | Thr | Val | Glu | Leu | Leu | Thr | Glu | Ala |
| | | | 420 | | | | | 425 | | | | | 430 | | |
| Val | Asp | Trp | Pro | Glu | Lys | Gln | Asp | Gly | Gly | Leu | Arg | Arg | Ala | Ala | Val |
| | | 435 | | | | | 440 | | | | | 445 | | | |
| Ser | Ser | Phe | Gly | Ile | Ser | Gly | Thr | Asn | Ala | His | Val | Val | Leu | Glu | Glu |
| | 450 | | | | 455 | | | | | 460 | | | | | |
| Ala | Pro | Ala | Val | Glu | Asp | Ser | Pro | Ala | Val | Glu | Pro | Pro | Ala | Gly | Gly |
| 465 | | | | 470 | | | | | 475 | | | | | 480 | |
| Gly | Val | Val | Pro | Trp | Pro | Val | Ser | Ala | Lys | Thr | Pro | Ala | Ala | Leu | Asp |
| | | | 485 | | | | | | 490 | | | | | 495 | |
| Ala | Gln | Ile | Gly | Gln | Leu | Ala | Ala | Tyr | Ala | Asp | Gly | Arg | Thr | Asp | Val |
| | | 500 | | | | | | 505 | | | | | 510 | | |
| Asp | Pro | Ala | Val | Ala | Ala | Arg | Ala | Leu | Val | Asp | Ser | Arg | Thr | Ala | Met |
| | 515 | | | | | | 520 | | | | | 525 | | | |
| Glu | His | Arg | Ala | Val | Ala | Val | Gly | Asp | Ser | Arg | Glu | Ala | Leu | Arg | Asp |
| | 530 | | | | | 535 | | | | 540 | | | | | |
| Ala | Leu | Arg | Met | Pro | Glu | Gly | Leu | Val | Arg | Gly | Thr | Ser | Ser | Asp | Val |
| 545 | | | | | 550 | | | | | 555 | | | | 560 | |
| Gly | Arg | Val | Ala | Phe | Val | Phe | Pro | Gly | Gln | Gly | Thr | Gln | Trp | Ala | Gly |
| | | | 565 | | | | | 570 | | | | | | 575 | |
| Met | Gly | Ala | Glu | Leu | Leu | Asp | Ser | Ser | Pro | Glu | Phe | Ala | Ala | Ser | Met |
| | | 580 | | | | | | 585 | | | | | 590 | | |
| Ala | Glu | Cys | Glu | Thr | Ala | Leu | Ser | Arg | Tyr | Val | Asp | Trp | Ser | Leu | Glu |
| | 595 | | | | | | 600 | | | | | 605 | | | |
| Ala | Val | Val | Arg | Gln | Glu | Pro | Gly | Ala | Pro | Thr | Leu | Asp | Arg | Val | Asp |
| 610 | | | | | | 615 | | | | | 620 | | | | |
| Val | Val | Gln | Pro | Val | Thr | Phe | Ala | Val | Met | Val | Ser | Leu | Ala | Lys | Val |
| 625 | | | | | 630 | | | | | 635 | | | | 640 | |
| Trp | Gln | His | His | Gly | Ile | Thr | Pro | Gln | Ala | Val | Val | Gly | His | Ser | Gln |
| | | | 645 | | | | | 650 | | | | | | 655 | |
| Gly | Glu | Ile | Ala | Ala | Ala | Tyr | Val | Ala | Gly | Ala | Leu | Thr | Leu | Asp | Asp |
| | | 660 | | | | | | 665 | | | | | 670 | | |
| Ala | Ala | Arg | Val | Val | Thr | Leu | Arg | Ser | Lys | Ser | Ile | Ala | Ala | His | Leu |
| | 675 | | | | | | 680 | | | | | 685 | | | |
| Ala | Gly | Lys | Gly | Gly | Met | Ile | Ser | Leu | Ala | Leu | Asp | Glu | Ala | Ala | Val |
| 690 | | | | | | 695 | | | | | 700 | | | | |
| Leu | Lys | Arg | Leu | Ser | Asp | Phe | Asp | Gly | Leu | Ser | Val | Ala | Ala | Val | Asn |
| 705 | | | | 710 | | | | | | 715 | | | | 720 | |
| Gly | Pro | Thr | Ala | Thr | Val | Val | Ser | Gly | Asp | Pro | Thr | Gln | Ile | Glu | Glu |
| | | | 725 | | | | | 730 | | | | | | 735 | |
| Leu | Ala | Arg | Thr | Cys | Glu | Ala | Asp | Gly | Val | Arg | Ala | Arg | Ile | Ile | Pro |
| | | 740 | | | | | | 745 | | | | | 750 | | |
| Val | Asp | Tyr | Ala | Ser | His | Ser | Arg | Gln | Val | Glu | Ile | Ile | Glu | Lys | Glu |
| | 755 | | | | | 760 | | | | | | 765 | | | |
| Leu | Ala | Glu | Val | Leu | Ala | Gly | Leu | Ala | Pro | Gln | Ala | Pro | His | Val | Pro |
| 770 | | | | | | 775 | | | | | 780 | | | | |
| Phe | Phe | Ser | Thr | Leu | Glu | Gly | Thr | Trp | Ile | Thr | Glu | Pro | Val | Leu | Asp |
| 785 | | | | 790 | | | | | | 795 | | | | 800 | |
| Gly | Thr | Tyr | Trp | Tyr | Arg | Asn | Leu | Arg | His | Arg | Val | Gly | Phe | Ala | Pro |
| | | | 805 | | | | | | 810 | | | | | 815 | |
| Ala | Val | Glu | Thr | Leu | Ala | Val | Asp | Gly | Phe | Thr | His | Phe | Ile | Glu | Val |
| | | | 820 | | | | | 825 | | | | | 830 | | |
| Ser | Ala | His | Pro | Val | Leu | Thr | Met | Thr | Leu | Pro | Glu | Thr | Val | Thr | Gly |
| | | 835 | | | | | 840 | | | | | 845 | | | |
| Leu | Gly | Thr | Leu | Arg | Arg | Glu | Gln | Gly | Gly | Gln | Glu | Arg | Leu | Val | Thr |
| | 850 | | | | | 855 | | | | | 860 | | | | |
| Ser | Leu | Ala | Glu | Ala | Trp | Ala | Asn | Gly | Leu | Thr | Ile | Asp | Trp | Ala | Pro |
| 865 | | | | 870 | | | | | | 875 | | | | 880 | |
| Ile | Leu | Pro | Thr | Ala | Thr | Gly | His | His | Pro | Glu | Leu | Pro | Thr | Tyr | Ala |
| | | | | 885 | | | | | 890 | | | | | 895 | |

| | | | | | | | | | | | | | | | | |
|------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|--|
| Phe | Gln | Thr | Glu | Arg | Phe | Trp | Leu | Gln | Ser | Ser | Ala | Pro | Thr | Ser | Ala | |
| | | | 900 | | | | | 905 | | | | | | 910 | | |
| Ala | Asp | Asp | Trp | Arg | Tyr | Arg | Val | Glu | Trp | Lys | Pro | Leu | Thr | Ala | Ser | |
| | | 915 | | | | | 920 | | | | | 925 | | | | |
| Gly | Gln | Ala | Asp | Leu | Ser | Gly | Arg | Trp | Ile | Val | Ala | Val | Gly | Ser | Glu | |
| | 930 | | | | | 935 | | | | | 940 | | | | | |
| Pro | Glu | Ala | Glu | Leu | Leu | Gly | Ala | Leu | Lys | Ala | Ala | Gly | Ala | Glu | Val | |
| 945 | | | | 950 | | | | | | 955 | | | | | 960 | |
| Asp | Val | Leu | Glu | Ala | Gly | Ala | Asp | Asp | Asp | Arg | Glu | Ala | Leu | Ala | Ala | |
| | | | 965 | | | | | 970 | | | | | | 975 | | |
| Arg | Leu | Thr | Ala | Leu | Thr | Thr | Gly | Asp | Gly | Phe | Thr | Gly | Val | Val | Ser | |
| | | 980 | | | | | 985 | | | | | | 990 | | | |
| Leu | Leu | Asp | Asp | Leu | Val | Pro | Gln | Val | Ala | Trp | Val | Gln | Ala | Leu | Gly | |
| | 995 | | | | | | 1000 | | | | | 1005 | | | | |
| Asp | Ala | Gly | Ile | Lys | Ala | Pro | Leu | Trp | Ser | Val | Thr | Gln | Gly | Ala | Val | |
| | 1010 | | | | | 1015 | | | | | 1020 | | | | | |
| Ser | Val | Gly | Arg | Leu | Asp | Thr | Pro | Ala | Asp | Pro | Asp | Arg | Ala | Met | Leu | |
| 1025 | | | | | 1030 | | | | | 1035 | | | | | 1040 | |
| Trp | Gly | Leu | Gly | Arg | Val | Val | Ala | Leu | Glu | His | Pro | Glu | Arg | Trp | Ala | |
| | | | 1045 | | | | | | 1050 | | | | | 1055 | | |
| Gly | Leu | Val | Asp | Leu | Pro | Ala | Gln | Pro | Asp | Ala | Ala | Ala | Leu | Ala | His | |
| | | 1060 | | | | | 1065 | | | | | | 1070 | | | |
| Leu | Val | Thr | Ala | Leu | Ser | Gly | Ala | Thr | Gly | Glu | Asp | Gln | Ile | Ala | Ile | |
| | 1075 | | | | | 1080 | | | | | | 1085 | | | | |
| Arg | Thr | Thr | Gly | Leu | His | Ala | Arg | Arg | Leu | Ala | Arg | Ala | Pro | Leu | His | |
| | 1090 | | | | | 1095 | | | | | 1100 | | | | | |
| Gly | Arg | Arg | Pro | Thr | Arg | Asp | Trp | Gln | Pro | His | Gly | Thr | Val | Leu | Ile | |
| 1105 | | | | | 1110 | | | | | 1115 | | | | | 1120 | |
| Thr | Gly | Gly | Thr | Gly | Ala | Leu | Gly | Ser | His | Ala | Ala | Arg | Trp | Met | Ala | |
| | | | 1125 | | | | | | 1130 | | | | | 1135 | | |
| His | His | Gly | Ala | Glu | His | Leu | Leu | Leu | Val | Ser | Arg | Ser | Gly | Glu | Gln | |
| | | 1140 | | | | | 1145 | | | | | | 1150 | | | |
| Ala | Pro | Gly | Ala | Thr | Gln | Leu | Thr | Ala | Glu | Leu | Thr | Ala | Ser | Gly | Ala | |
| | 1155 | | | | | | 1160 | | | | | 1165 | | | | |
| Arg | Val | Thr | Ile | Ala | Ala | Cys | Asp | Val | Ala | Asp | Pro | His | Ala | Met | Arg | |
| | 1170 | | | | | 1175 | | | | | 1180 | | | | | |
| Thr | Leu | Leu | Asp | Ala | Ile | Pro | Ala | Glu | Thr | Pro | Leu | Thr | Ala | Val | Val | |
| 1185 | | | | | 1190 | | | | | 1195 | | | | | 1200 | |
| His | Thr | Ala | Gly | Ala | Pro | Gly | Gly | Asp | Pro | Leu | Asp | Val | Thr | Gly | Pro | |
| | | | 1205 | | | | | | 1210 | | | | | 1215 | | |
| Glu | Asp | Ile | Ala | Arg | Ile | Leu | Gly | Ala | Lys | Thr | Ser | Gly | Ala | Glu | Val | |
| | | 1220 | | | | | 1225 | | | | | | 1230 | | | |
| Leu | Asp | Asp | Leu | Leu | Arg | Gly | Thr | Pro | Leu | Asp | Ala | Phe | Val | Leu | Tyr | |
| | 1235 | | | | | | 1240 | | | | | 1245 | | | | |
| Ser | Ser | Asn | Ala | Gly | Val | Trp | Gly | Ser | Gly | Ser | Gln | Gly | Val | Tyr | Ala | |
| | 1250 | | | | | 1255 | | | | | 1260 | | | | | |
| Ala | Ala | Asn | Ala | His | Leu | Asp | Ala | Leu | Ala | Ala | Arg | Arg | Arg | Ala | Arg | |
| 1265 | | | | | 1270 | | | | | 1275 | | | | | 1280 | |
| Gly | Glu | Thr | Ala | Thr | Ser | Val | Ala | Trp | Gly | Leu | Trp | Ala | Gly | Asp | Gly | |
| | | | 1285 | | | | | | 1290 | | | | | 1295 | | |
| Met | Gly | Arg | Gly | Ala | Asp | Asp | Ala | Tyr | Trp | Gln | Arg | Arg | Gly | Ile | Arg | |
| | | 1300 | | | | | 1305 | | | | | | 1310 | | | |
| Pro | Met | Ser | Pro | Asp | Arg | Ala | Leu | Asp | Glu | Leu | Ala | Lys | Ala | Leu | Ser | |
| | | 1315 | | | | | 1320 | | | | | 1325 | | | | |
| His | Asp | Glu | Thr | Phe | Val | Ala | Val | Ala | Asp | Val | Asp | Trp | Glu | Arg | Phe | |
| | 1330 | | | | | 1335 | | | | | 1340 | | | | | |
| Ala | Pro | Ala | Phe | Thr | Val | Ser | Arg | Pro | Ser | Leu | Leu | Leu | Asp | Gly | Val | |
| 1345 | | | | | 1350 | | | | | 1355 | | | | | 1360 | |
| Pro | Glu | Ala | Arg | Gln | Ala | Leu | Ala | Ala | Pro | Val | Gly | Ala | Pro | Ala | Pro | |
| | | | 1365 | | | | | | 1370 | | | | | 1375 | | |
| Gly | Asp | Ala | Ala | Val | Ala | Pro | Thr | Gly | Gln | Ser | Ser | Ala | Leu | Ala | Ala | |
| | | 1380 | | | | | | 1385 | | | | | 1390 | | | |

Ile Thr Ala Leu Pro Glu Pro Glu Arg Arg Pro Ala Leu Leu Thr Leu
 1395 1400 1405
 Val Arg Thr His Ala Ala Val Leu Gly His Ser Ser Pro Asp Arg
 1410 1415 1420
 Val Ala Pro Gly Arg Ala Phe Thr Glu Leu Gly Phe Asp Ser Leu Thr
 1425 1430 1435 1440
 Ala Val Gln Leu Arg Asn Gln Leu Ser Thr Val Val Gly Asn Arg Leu
 1445 1450 1455
 Pro Ala Thr Thr Val Phe Asp His Pro Thr Pro Ala Ala Leu Ala Ala
 1460 1465 1470
 His Leu His Glu Ala Tyr Leu Ala Pro Ala Glu Pro Ala Pro Thr Asp
 1475 1480 1485
 Trp Glu Gly Arg Val Arg Arg Ala Leu Ala Glu Leu Pro Leu Asp Arg
 1490 1495 1500
 Leu Arg Asp Ala Gly Val Leu Asp Thr Val Leu Arg Leu Thr Gly Ile
 1505 1510 1515 1520
 Glu Pro Glu Pro Gly Ser Gly Gly Ser Asp Gly Gly Ala Ala Asp Pro
 1525 1530 1535
 Gly Ala Glu Pro Glu Ala Ser Ile Asp Asp Leu Asp Ala Glu Ala Leu
 1540 1545 1550
 Ile Arg Met Ala Leu Gly Pro Arg Asn Thr
 1555 1560

<210> 36

<211> 4041

<212> DNA

<213> Streptomyces venezuelae

<400> 36

| | | | | | | |
|------------|-------------|-------------|-------------|------------|-------------|------|
| atgacgagtt | ccaacgaaca | gttggtggac | gctctgcgcy | cctctctcaa | ggagaacgaa | 60 |
| gaactccgga | aagagagccg | tcgccggggc | gaccgtcggc | aggagcccat | ggcgatcgtc | 120 |
| ggcatgagct | gccggttcgc | gggcggaatc | cgggtccccc | aggacctctg | ggacgccgtc | 180 |
| gccgcgggca | aggacctggt | ctccgaggtg | ccggaggagc | gcggctggga | catcgactcc | 240 |
| ctctacgacc | cggtgcccgg | gcgcaagggc | acgacgtacg | tccgcaacgc | cgcgttcctc | 300 |
| gacgacgccg | ccgattcgga | cgcggccttc | ttcgggatct | cgccgcgcga | ggccctcgcc | 360 |
| atggacccgc | agcagcggca | gctcctcgaa | gcctcctggg | aggtcttcga | gcgggcccgc | 420 |
| atcgaccccg | cgtcgggtccg | cggcaccgac | gtcggcggtg | acgtgggctg | tggctaccag | 480 |
| gactacgcgc | cggacatccg | ggtcgcccc | gaaggcaccg | gcggttacgt | cgtcaccggc | 540 |
| aactcctccg | ccgtggcctc | cgggcgcata | gcgtactccc | tcggcctgga | gggacccgcc | 600 |
| gtgaccgtgg | acacggcgtg | ctcctcttcg | ctcgctcgcc | tgcacctcgc | cctgaagggc | 660 |
| ctgcggaacg | gcgactgctc | gacggcactc | gtgggcggcg | tggccgtcct | cgcgacgccg | 720 |
| ggcgcggtca | tcgagttcag | cagccagcag | gccatggccg | ccgacggccg | gaccaagggc | 780 |
| ttcgccctcg | cggcgagcgg | cctcgccctg | ggcgagggcg | tcgccgtact | cctcctcgaa | 840 |
| cggctctccg | acgcgcggcg | caagggccac | cgggtcctgg | ccgtcgtgcg | cggcagcgcc | 900 |
| atcaaccagg | acggcgcgag | caacggcctc | acggctccgc | acgggccctc | ccagcagcac | 960 |
| ctgatccgcc | aggccctggc | cgacgcgcgg | ctcacgtcga | gcgacgtgga | cgtcgtggag | 1020 |
| ggccacggca | cggggacccg | tctcggcgac | ccgatcgagg | cgcaggcgct | gctcgccacg | 1080 |
| tacgggcagg | ggcgcccccc | ggggcagccg | ctgcggctgg | ggacgctgaa | gtcgaacatc | 1140 |
| gggcacacgc | aggccgcttc | gggtgtcgcc | ggtgtcatca | agatggtgca | ggcgtgcgc | 1200 |
| cacgggggtg | tgccgaagac | cctgcacgtg | gacgagccga | cggaccaggt | cgactggtcg | 1260 |
| gccggttcgg | tcgagctgct | caccgaggcc | gtggactggc | cggagcggcc | gggcccggtc | 1320 |
| cgccggggcg | gcgtctccgc | gttcggcggtg | ggcgggacga | acgcgcacgt | cgtcctggag | 1380 |
| gaggcccccg | cggtcgagga | gtccccctgcc | gtcgagccgc | cggccgggtg | cggcgtgggtg | 1440 |
| ccgtggccgg | tgtccgcgaa | gacctcggcc | gcactggacg | cccagatcgg | gcagctcgcc | 1500 |
| gcatacgcg | aagaccgcac | ggacgtggat | cggcggtggg | ccgccgcgc | cctggctcgac | 1560 |
| agccgtacgg | cgatggagca | ccgcgcggtc | gcggtcggcg | acagccggga | ggcactgcgg | 1620 |
| gacgccctgc | ggatgccgga | aggactggta | cggggcacgg | tcaccgatcc | gggcccgggtg | 1680 |
| gcgttcgtct | ccccgggcca | gggcacgcag | tgggcccggca | tgggcgcgca | actcctcgac | 1740 |
| agctcaccgc | aattcgccgc | cgccatggcc | gaatgcgaga | ccgcactctc | cccgtacgtc | 1800 |
| gactggtctc | tcgaagccgt | cgtccgacag | gtccccagcg | caccgacact | cgaccgcgtc | 1860 |
| gacgtcgtcc | agcccgtcac | cttcgcgcgtc | atggtctccc | tcgccaaggt | ctggcagcac | 1920 |
| cacggcatca | cccccgaggc | cgtcatcggc | cactcccagg | gcgagatcgc | cgccgcgtac | 1980 |

| | | | | | | |
|-------------|-------------|-------------|-------------|------------|------------|------|
| gtcgccggtg | ccctcaccct | cgacgacgcc | gctcgtgtcg | tgaccctccg | cagcaagtcc | 2040 |
| atcgccgccc | acctcgccgg | caagggcggc | atgatctccc | tcgccctcag | cgaggaagcc | 2100 |
| acccggcagc | gcatcgagaa | cctccacgga | ctgtcgatcg | ccgccgtcaa | cgggcctacc | 2160 |
| gccaccgtgg | tttcgggcca | ccccaccag | atccaagaac | ttgtcaggc | gtgtgaggcc | 2220 |
| gacggcatcc | gcgcacggat | catccccgtc | gactacgcct | cccacagcgc | ccacgtcgag | 2280 |
| accatcgaga | acgaactcgc | cgacgtcctg | gcggggttgt | ccccccagac | accccaggtc | 2340 |
| ccctttcttct | ccaccctcga | aggcacctgg | atcacgaaac | ccgccctcga | cggcggctac | 2400 |
| tggtaccgca | acctccgcca | tcgtgtgggc | ttcgccccgg | ccgtcgagac | cctcgccacc | 2460 |
| gacgaaggct | tcaccactt | catcgaggtc | agcgcaccac | ccgtcctcac | catgaccctc | 2520 |
| cccgacaagg | tcaccggcct | ggccaccctc | cgacgcgagg | acggcggaca | gcaccgcctc | 2580 |
| accacctccc | ttgccgaggc | ctggggccaac | ggcctcgccc | tcgactgggc | ctccctcctg | 2640 |
| cccggccagg | gcgccctcag | ccccgccgtc | cccgacctcc | cgacgtacgc | cttcacgac | 2700 |
| cgctcgtaact | ggatcagccc | cgcgggtccc | ggcgaggcgc | ccgcgcacac | cgttccggg | 2760 |
| cgcgagggccg | tcgccgagac | ggggctcgcg | tgggggccccg | gtgccgagga | cctcgacgag | 2820 |
| gagggccggc | gcagcgccgt | actcgcgatg | gtgatgcggc | aggcggcctc | cgtgctccgg | 2880 |
| tgcgactcgc | ccgaagaggt | ccccgtcgac | cgcccgtcgc | gggagatcgg | cttcgactcg | 2940 |
| ctgaccgccc | tcgacttccg | caaccgcgtc | aaccggctga | ccggtctcca | gctgccgccc | 3000 |
| accgtcgtgt | tccagcacc | gacgcccgtc | gcgctcgccg | agcgcatcag | cgacgagctg | 3060 |
| gccgagcggg | actgggcccgt | cgccgagccg | tcggatcacg | agcaggcggg | ggaggagaag | 3120 |
| gccgccgctc | cggcgggggc | ccgctccggg | gccgacaccg | gcgccggcgc | cgggatgttc | 3180 |
| cgcgccctgt | tccggcaggc | cgtggaggac | gaccggtacg | gcgagttcct | cgacgtcctc | 3240 |
| gccgaagcct | ccgcgttccg | cccgcagttc | gcctcgcccc | aggcctgctc | ggagcggctc | 3300 |
| gacccgggtgc | tgctcgccgg | cggtccgacg | gaccgggccc | aaggccgtgc | cgttctcgtc | 3360 |
| ggctgcaccg | gcaccgcggc | gaacggcggc | ccgcacgagt | tcctgcccgt | cagcacctcc | 3420 |
| ttccaggagg | agcgggactt | cctcgccgta | cctctccccg | gctacggcac | gggtacgggc | 3480 |
| accggcacgg | ccctcctccc | ggccgatctc | gacaccgcgc | tcgacgccc | ggcccgggcg | 3540 |
| atcctccggg | ccgccgggga | cgccccggtc | gtcctgctcg | ggcactccgg | cggcgccctg | 3600 |
| ctcgcgcacg | agctggcctt | ccgcctggag | cgggcgcacg | gcgcgccgcc | ggccgggatc | 3660 |
| gtcctggtcg | accctatcc | gccgggccat | caggagccca | tcgaggtgtg | gagcaggcag | 3720 |
| ctgggcgagg | gcctgttcgc | gggcgagctg | gagccgatgt | ccgatgcgcg | gctgctggcc | 3780 |
| atgggcgggt | acgcgcgggt | cctcgccggc | cgcggccggg | gccgcagcag | cgcgcccggt | 3840 |
| cttctgggtcc | gtgcctccga | accgctgggc | gactggcagg | aggagcgggg | cgactggcgt | 3900 |
| gcccactggg | accttccgca | caccgtcgcg | gacgtgccgg | gcgaccactt | cacgatgatg | 3960 |
| cgggaccacg | cgccggccgt | cgccgaggcc | gtcctctcct | ggctcgacgc | catcgagggc | 4020 |
| atcgaggggg | cgggcaagtg | a | | | | 4041 |

<210> 37

<211> 1346

<212> PRT

<213> Streptomyces venezuelae

<400> 37

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Thr | Ser | Ser | Asn | Glu | Gln | Leu | Val | Asp | Ala | Leu | Arg | Ala | Ser | Leu |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Lys | Glu | Asn | Glu | Glu | Leu | Arg | Lys | Glu | Ser | Arg | Arg | Arg | Ala | Asp | Arg |
| | | 20 | | | | | | 25 | | | | | 30 | | |
| Arg | Gln | Glu | Pro | Met | Ala | Ile | Val | Gly | Met | Ser | Cys | Arg | Phe | Ala | Gly |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Gly | Ile | Arg | Ser | Pro | Glu | Asp | Leu | Trp | Asp | Ala | Val | Ala | Ala | Gly | Lys |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Asp | Leu | Val | Ser | Glu | Val | Pro | Glu | Glu | Arg | Gly | Trp | Asp | Ile | Asp | Ser |
| 65 | | | | 70 | | | | | 75 | | | | | 80 | |
| Leu | Tyr | Asp | Pro | Val | Pro | Gly | Arg | Lys | Gly | Thr | Thr | Tyr | Val | Arg | Asn |
| | | | 85 | | | | | | 90 | | | | | 95 | |
| Ala | Ala | Phe | Leu | Asp | Asp | Ala | Ala | Gly | Phe | Asp | Ala | Ala | Phe | Phe | Gly |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Ile | Ser | Pro | Arg | Glu | Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln | Arg | Gln | Leu |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Leu | Glu | Ala | Ser | Trp | Glu | Val | Phe | Glu | Arg | Ala | Gly | Ile | Asp | Pro | Ala |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Ser | Val | Arg | Gly | Thr | Asp | Val | Gly | Val | Tyr | Val | Gly | Cys | Gly | Tyr | Gln |
| 145 | | | | 150 | | | | | 155 | | | | | 160 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Tyr | Ala | Pro | Asp | Ile | Arg | Val | Ala | Pro | Glu | Gly | Thr | Gly | Gly | Tyr |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Val | Val | Thr | Gly | Asn | Ser | Ser | Ala | Val | Ala | Ser | Gly | Arg | Ile | Ala | Tyr |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Ser | Leu | Gly | Leu | Glu | Gly | Pro | Ala | Val | Thr | Val | Asp | Thr | Ala | Cys | Ser |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Ser | Ser | Leu | Val | Ala | Leu | His | Leu | Ala | Leu | Lys | Gly | Leu | Arg | Asn | Gly |
| | | 210 | | | | 215 | | | | | 220 | | | | |
| Asp | Cys | Ser | Thr | Ala | Leu | Val | Gly | Gly | Val | Ala | Val | Leu | Ala | Thr | Pro |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Gly | Ala | Phe | Ile | Glu | Phe | Ser | Ser | Gln | Gln | Ala | Met | Ala | Ala | Asp | Gly |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Arg | Thr | Lys | Gly | Phe | Ala | Ser | Ala | Ala | Asp | Gly | Leu | Ala | Trp | Gly | Glu |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Gly | Val | Ala | Val | Leu | Leu | Leu | Glu | Arg | Leu | Ser | Asp | Ala | Arg | Arg | Lys |
| | | | 275 | | | | 280 | | | | | 285 | | | |
| Gly | His | Arg | Val | Leu | Ala | Val | Val | Arg | Gly | Ser | Ala | Ile | Asn | Gln | Asp |
| | | | 290 | | | 295 | | | | | 300 | | | | |
| Gly | Ala | Ser | Asn | Gly | Leu | Thr | Ala | Pro | His | Gly | Pro | Ser | Gln | Gln | His |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Leu | Ile | Arg | Gln | Ala | Leu | Ala | Asp | Ala | Arg | Leu | Thr | Ser | Ser | Asp | Val |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Asp | Val | Val | Glu | Gly | His | Gly | Thr | Gly | Thr | Arg | Leu | Gly | Asp | Pro | Ile |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Glu | Ala | Gln | Ala | Leu | Leu | Ala | Thr | Tyr | Gly | Gln | Gly | Arg | Ala | Pro | Gly |
| | | | 355 | | | | 360 | | | | | 365 | | | |
| Gln | Pro | Leu | Arg | Leu | Gly | Thr | Leu | Lys | Ser | Asn | Ile | Gly | His | Thr | Gln |
| | | | 370 | | | 375 | | | | | 380 | | | | |
| Ala | Ala | Ser | Gly | Val | Ala | Gly | Val | Ile | Lys | Met | Val | Gln | Ala | Leu | Arg |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| His | Gly | Val | Leu | Pro | Lys | Thr | Leu | His | Val | Asp | Glu | Pro | Thr | Asp | Gln |
| | | | | 405 | | | | | 410 | | | | | 415 | |
| Val | Asp | Trp | Ser | Ala | Gly | Ser | Val | Glu | Leu | Leu | Thr | Glu | Ala | Val | Asp |
| | | | 420 | | | | | 425 | | | | | 430 | | |
| Trp | Pro | Glu | Arg | Pro | Gly | Arg | Leu | Arg | Arg | Ala | Gly | Val | Ser | Ala | Phe |
| | | | 435 | | | | 440 | | | | | 445 | | | |
| Gly | Val | Gly | Gly | Thr | Asn | Ala | His | Val | Val | Leu | Glu | Glu | Ala | Pro | Ala |
| | | | 450 | | | 455 | | | | | 460 | | | | |
| Val | Glu | Glu | Ser | Pro | Ala | Val | Glu | Pro | Pro | Ala | Gly | Gly | Gly | Val | Val |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 |
| Pro | Trp | Pro | Val | Ser | Ala | Lys | Thr | Ser | Ala | Ala | Leu | Asp | Ala | Gln | Ile |
| | | | | 485 | | | | | 490 | | | | | 495 | |
| Gly | Gln | Leu | Ala | Ala | Tyr | Ala | Glu | Asp | Arg | Thr | Asp | Val | Asp | Pro | Ala |
| | | | 500 | | | | | 505 | | | | | 510 | | |
| Val | Ala | Ala | Arg | Ala | Leu | Val | Asp | Ser | Arg | Thr | Ala | Met | Glu | His | Arg |
| | | | 515 | | | | 520 | | | | | 525 | | | |
| Ala | Val | Ala | Val | Gly | Asp | Ser | Arg | Glu | Ala | Leu | Arg | Asp | Ala | Leu | Arg |
| | | | 530 | | | 535 | | | | | 540 | | | | |
| Met | Pro | Glu | Gly | Leu | Val | Arg | Gly | Thr | Val | Thr | Asp | Pro | Gly | Arg | Val |
| 545 | | | | | 550 | | | | | 555 | | | | | 560 |
| Ala | Phe | Val | Phe | Pro | Gly | Gln | Gly | Thr | Gln | Trp | Ala | Gly | Met | Gly | Ala |
| | | | | 565 | | | | | 570 | | | | | 575 | |
| Glu | Leu | Leu | Asp | Ser | Ser | Pro | Glu | Phe | Ala | Ala | Ala | Met | Ala | Glu | Cys |
| | | | 580 | | | | | 585 | | | | | 590 | | |
| Glu | Thr | Ala | Leu | Ser | Pro | Tyr | Val | Asp | Trp | Ser | Leu | Glu | Ala | Val | Val |
| | | | 595 | | | | 600 | | | | | 605 | | | |
| Arg | Gln | Ala | Pro | Ser | Ala | Pro | Thr | Leu | Asp | Arg | Val | Asp | Val | Val | Gln |
| | | | 610 | | | 615 | | | | | 620 | | | | |
| Pro | Val | Thr | Phe | Ala | Val | Met | Val | Ser | Leu | Ala | Lys | Val | Trp | Gln | His |
| 625 | | | | | 630 | | | | | 635 | | | | | 640 |
| His | Gly | Ile | Thr | Pro | Glu | Ala | Val | Ile | Gly | His | Ser | Gln | Gly | Glu | Ile |
| | | | | 645 | | | | | 650 | | | | | 655 | |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Ala | Ala | Ala | Tyr | Val | Ala | Gly | Ala | Leu | Thr | Leu | Asp | Asp | Ala | Ala | Arg | 660 | 665 | 670 |
| Val | Val | Thr | Leu | Arg | Ser | Lys | Ser | Ile | Ala | Ala | His | Leu | Ala | Gly | Lys | 675 | 680 | 685 |
| Gly | Gly | Met | Ile | Ser | Leu | Ala | Leu | Ser | Glu | Glu | Ala | Thr | Arg | Gln | Arg | 690 | 695 | 700 |
| Ile | Glu | Asn | Leu | His | Gly | Leu | Ser | Ile | Ala | Ala | Val | Asn | Gly | Pro | Thr | 705 | 710 | 715 |
| Ala | Thr | Val | Val | Ser | Gly | Asp | Pro | Thr | Gln | Ile | Gln | Glu | Leu | Ala | Gln | 725 | 730 | 735 |
| Ala | Cys | Glu | Ala | Asp | Gly | Ile | Arg | Ala | Arg | Ile | Ile | Pro | Val | Asp | Tyr | 740 | 745 | 750 |
| Ala | Ser | His | Ser | Ala | His | Val | Glu | Thr | Ile | Glu | Asn | Glu | Leu | Ala | Asp | 755 | 760 | 765 |
| Val | Leu | Ala | Gly | Leu | Ser | Pro | Gln | Thr | Pro | Gln | Val | Pro | Phe | Phe | Ser | 770 | 775 | 780 |
| Thr | Leu | Glu | Gly | Thr | Trp | Ile | Thr | Glu | Pro | Ala | Leu | Asp | Gly | Gly | Tyr | 785 | 790 | 795 |
| Trp | Tyr | Arg | Asn | Leu | Arg | His | Arg | Val | Gly | Phe | Ala | Pro | Ala | Val | Glu | 805 | 810 | 815 |
| Thr | Leu | Ala | Thr | Asp | Glu | Gly | Phe | Thr | His | Phe | Ile | Glu | Val | Ser | Ala | 820 | 825 | 830 |
| His | Pro | Val | Leu | Thr | Met | Thr | Leu | Pro | Asp | Lys | Val | Thr | Gly | Leu | Ala | 835 | 840 | 845 |
| Thr | Leu | Arg | Arg | Glu | Asp | Gly | Gly | Gln | His | Arg | Leu | Thr | Thr | Ser | Leu | 850 | 855 | 860 |
| Ala | Glu | Ala | Trp | Ala | Asn | Gly | Leu | Ala | Leu | Asp | Trp | Ala | Ser | Leu | Leu | 865 | 870 | 875 |
| Pro | Ala | Thr | Gly | Ala | Leu | Ser | Pro | Ala | Val | Pro | Asp | Leu | Pro | Thr | Tyr | 885 | 890 | 895 |
| Ala | Phe | Gln | His | Arg | Ser | Tyr | Trp | Ile | Ser | Pro | Ala | Gly | Pro | Gly | Glu | 900 | 905 | 910 |
| Ala | Pro | Ala | His | Thr | Ala | Ser | Gly | Arg | Glu | Ala | Val | Ala | Glu | Thr | Gly | 915 | 920 | 925 |
| Leu | Ala | Trp | Gly | Pro | Gly | Ala | Glu | Asp | Leu | Asp | Glu | Glu | Gly | Arg | Arg | 930 | 935 | 940 |
| Ser | Ala | Val | Leu | Ala | Met | Val | Met | Arg | Gln | Ala | Ala | Ser | Val | Leu | Arg | 945 | 950 | 955 |
| Cys | Asp | Ser | Pro | Glu | Glu | Val | Pro | Val | Asp | Arg | Pro | Leu | Arg | Glu | Ile | 965 | 970 | 975 |
| Gly | Phe | Asp | Ser | Leu | Thr | Ala | Val | Asp | Phe | Arg | Asn | Arg | Val | Asn | Arg | 980 | 985 | 990 |
| Leu | Thr | Gly | Leu | Gln | Leu | Pro | Pro | Thr | Val | Val | Phe | Gln | His | Pro | Thr | 995 | 1000 | 1005 |
| Pro | Val | Ala | Leu | Ala | Glu | Arg | Ile | Ser | Asp | Glu | Leu | Ala | Glu | Arg | Asn | 1010 | 1015 | 1020 |
| Trp | Ala | Val | Ala | Glu | Pro | Ser | Asp | His | Glu | Gln | Ala | Glu | Glu | Glu | Lys | 1025 | 1030 | 1035 |
| Ala | Ala | Ala | Pro | Ala | Gly | Ala | Arg | Ser | Gly | Ala | Asp | Thr | Gly | Ala | Gly | 1045 | 1050 | 1055 |
| Ala | Gly | Met | Phe | Arg | Ala | Leu | Phe | Arg | Gln | Ala | Val | Glu | Asp | Asp | Arg | 1060 | 1065 | 1070 |
| Tyr | Gly | Glu | Phe | Leu | Asp | Val | Leu | Ala | Glu | Ala | Ser | Ala | Phe | Arg | Pro | 1075 | 1080 | 1085 |
| Gln | Phe | Ala | Ser | Pro | Glu | Ala | Cys | Ser | Glu | Arg | Leu | Asp | Pro | Val | Leu | 1090 | 1095 | 1100 |
| Leu | Ala | Gly | Gly | Pro | Thr | Asp | Arg | Ala | Glu | Gly | Arg | Ala | Val | Leu | Val | 1105 | 1110 | 1115 |
| Gly | Cys | Thr | Gly | Thr | Ala | Ala | Asn | Gly | Gly | Pro | His | Glu | Phe | Leu | Arg | 1125 | 1130 | 1135 |
| Leu | Ser | Thr | Ser | Phe | Gln | Glu | Glu | Arg | Asp | Phe | Leu | Ala | Val | Pro | Leu | 1140 | 1145 | 1150 |

Pro Gly Tyr Gly Thr Gly Thr Gly Thr Gly Thr Ala Leu Leu Pro Ala
 1155 1160 1165
 Asp Leu Asp Thr Ala Leu Asp Ala Gln Ala Arg Ala Ile Leu Arg Ala
 1170 1175 1180
 Ala Gly Asp Ala Pro Val Val Leu Leu Gly His Ser Gly Gly Ala Leu
 1185 1190 1195 1200
 Leu Ala His Glu Leu Ala Phe Arg Leu Glu Arg Ala His Gly Ala Pro
 1205 1210 1215
 Pro Ala Gly Ile Val Leu Val Asp Pro Tyr Pro Pro Gly His Gln Glu
 1220 1225 1230
 Pro Ile Glu Val Trp Ser Arg Gln Leu Gly Glu Gly Leu Phe Ala Gly
 1235 1240 1245
 Glu Leu Glu Pro Met Ser Asp Ala Arg Leu Leu Ala Met Gly Arg Tyr
 1250 1255 1260
 Ala Arg Phe Leu Ala Gly Pro Arg Pro Gly Arg Ser Ser Ala Pro Val
 1265 1270 1275 1280
 Leu Leu Val Arg Ala Ser Glu Pro Leu Gly Asp Trp Gln Glu Glu Arg
 1285 1290 1295
 Gly Asp Trp Arg Ala His Trp Asp Leu Pro His Thr Val Ala Asp Val
 1300 1305 1310
 Pro Gly Asp His Phe Thr Met Met Arg Asp His Ala Pro Ala Val Ala
 1315 1320 1325
 Glu Ala Val Leu Ser Trp Leu Asp Ala Ile Glu Gly Ile Glu Gly Ala
 1330 1335 1340
 Gly Lys
 1345

<210> 38

<211> 1251

<212> DNA

<213> Streptomyces venezuelae

<400> 38

| | | | | | | |
|-------------|------------|------------|------------|-------------|-------------|------|
| gtgcgccgta | cccagcaggg | aacgaccgct | tctcccccg | tactcgacct | cggggccctg | 60 |
| gggcaggatt | tcgcggccga | tccgtatccg | acgtacgcga | gactgctgctg | cgagggtccg | 120 |
| gcccaccggg | tgcgcacccc | cgagggggac | gaggtgtggc | tggtcgctcg | ctacgaccgg | 180 |
| gcgcggggcg | tcctcgccga | tccccgggtc | agcaaggact | ggcgcaactc | cacgactccc | 240 |
| ctgaccgagg | ccgaggccgc | gctcaaccac | aacatgctgg | agtccgacct | gccgcggcac | 300 |
| accgcgctgc | gcaagctggt | ggcccgtgag | ttcaccatgc | gccgggtcga | ggtgctgcgg | 360 |
| ccccgggtcc | aggagatcgt | cgacgggtc | gtggacgcc | tgctggcgcc | gcccgcgggc | 420 |
| cgcgccgatc | tgatggagtc | cctggcctgg | ccgctgccga | tcaccgtgat | ctccgaactc | 480 |
| ctcggcgtgc | ccgagccgga | ccgcgccgcc | ttccgcgtct | ggaccgacgc | cttcgtcttc | 540 |
| ccggacgatc | ccgccaggc | ccagaccgcc | atggccgaga | tgagcggcta | tctctcccgg | 600 |
| ctcatcgact | ccaagcgcg | gcaggacggc | gaggacctgc | tcagcgcgct | cgtgcggacc | 660 |
| agcgacgagg | acggctccc | gctgacctcc | gaggagctgc | tcggtatggc | ccacatcctg | 720 |
| ctcgtcgcg | ggcacgagac | cacggtcaat | ctgatcgcca | acggcatgta | cgcgctgctc | 780 |
| tcgcacccc | accagctggc | cgccctgcgg | gccgacatga | cgctcttgga | cggcgcgggtg | 840 |
| gaggagatgt | tgcgctacga | gggcccgtg | gaatccgcga | cctaccgctt | cccggtcgag | 900 |
| cccgctcgacc | tggaaggcac | ggtcatcccg | gccggtgaca | cggctcctcg | cgctcctggcc | 960 |
| gacgcccacc | gcacccccga | gcgcttccc | gacccgcacc | gcttcgacat | ccgcccgggac | 1020 |
| accgcccggc | atctcgctt | cggccacggc | atccacttct | gcacgcggcg | ccccttgggc | 1080 |
| cggttgagg | ccggatcgc | cgtccgcgcc | cttctcgaac | gctgcccgga | cctcgccctg | 1140 |
| gacgtctccc | ccggcgaact | cgtgtggtat | ccgaaccgga | tgattcgcg | gctcaaggcc | 1200 |
| ctgccgatcc | gctggcgggc | aggacgggag | gcgggccgcc | gtaccggttg | a | 1251 |

<210> 39

<211> 416

<212> PRT

<213> Streptomyces venezuelae

<400> 39

Met Arg Arg Thr Gln Gln Gly Thr Thr Ala Ser Pro Pro Val Leu Asp
1 5 10 15
Leu Gly Ala Leu Gly Gln Asp Phe Ala Ala Asp Pro Tyr Pro Thr Tyr
20 25 30
Ala Arg Leu Arg Ala Glu Gly Pro Ala His Arg Val Arg Thr Pro Glu
35 40 45
Gly Asp Glu Val Trp Leu Val Val Gly Tyr Asp Arg Ala Arg Ala Val
50 55 60
Leu Ala Asp Pro Arg Phe Ser Lys Asp Trp Arg Asn Ser Thr Thr Pro
65 70 75 80
Leu Thr Glu Ala Glu Ala Ala Leu Asn His Asn Met Leu Glu Ser Asp
85 90 95
Pro Pro Arg His Thr Arg Leu Arg Lys Leu Val Ala Arg Glu Phe Thr
100 105 110
Met Arg Arg Val Glu Leu Leu Arg Pro Arg Val Gln Glu Ile Val Asp
115 120 125
Gly Leu Val Asp Ala Met Leu Ala Ala Pro Asp Gly Arg Ala Asp Leu
130 135 140
Met Glu Ser Leu Ala Trp Pro Leu Pro Ile Thr Val Ile Ser Glu Leu
145 150 155 160
Leu Gly Val Pro Glu Pro Asp Arg Ala Ala Phe Arg Val Trp Thr Asp
165 170 175
Ala Phe Val Phe Pro Asp Asp Pro Ala Gln Ala Gln Thr Ala Met Ala
180 185 190
Glu Met Ser Gly Tyr Leu Ser Arg Leu Ile Asp Ser Lys Arg Gly Gln
195 200 205
Asp Gly Glu Asp Leu Leu Ser Ala Leu Val Arg Thr Ser Asp Glu Asp
210 215 220
Gly Ser Arg Leu Thr Ser Glu Glu Leu Leu Gly Met Ala His Ile Leu
225 230 235 240
Leu Val Ala Gly His Glu Thr Thr Val Asn Leu Ile Ala Asn Gly Met
245 250 255
Tyr Ala Leu Leu Ser His Pro Asp Gln Leu Ala Ala Leu Arg Ala Asp
260 265 270
Met Thr Leu Leu Asp Gly Ala Val Glu Glu Met Leu Arg Tyr Glu Gly
275 280 285
Pro Val Glu Ser Ala Thr Tyr Arg Phe Pro Val Glu Pro Val Asp Leu
290 295 300
Asp Gly Thr Val Ile Pro Ala Gly Asp Thr Val Leu Val Val Leu Ala
305 310 315 320
Asp Ala His Arg Thr Pro Glu Arg Phe Pro Asp Pro His Arg Phe Asp
325 330 335
Ile Arg Arg Asp Thr Ala Gly His Leu Ala Phe Gly His Gly Ile His
340 345 350
Phe Cys Ile Gly Ala Pro Leu Ala Arg Leu Glu Ala Arg Ile Ala Val
355 360 365
Arg Ala Leu Leu Glu Arg Cys Pro Asp Leu Ala Leu Asp Val Ser Pro
370 375 380
Gly Glu Leu Val Trp Tyr Pro Asn Pro Met Ile Arg Gly Leu Lys Ala
385 390 395 400
Leu Pro Ile Arg Trp Arg Arg Gly Arg Glu Ala Gly Arg Arg Thr Gly
405 410 415

<210> 40

<211> 2787

<212> DNA

<213> *Streptomyces venezuelae*

<400> 40

atgaatctgg tggaacgcga cggggagata gcccatctca gggccgttct tgacgcatcc
gccgcaggtg acgggacgct cttactcgtc tccggaccgg ccggcagcgg gaagacggag

60

120

| | | | | | | |
|-------------|-------------|-------------|------------|------------|------------|------|
| ctgctgcggt | cgctccgccc | gctggccgcc | gagcgggaga | ccccgtctg | gtcggtcggy | 180 |
| gcgctgcggy | gtgaccgcga | catccccctg | ggcgtcctct | gccagttact | ccgcagcgcc | 240 |
| gaacaacacg | gtgccgacac | ctccgccgtc | cgcgacctgc | tggacgccgc | ctcgcggcgy | 300 |
| gccggaaacc | tcacctcccc | cgccgacgcy | ccgctccgcy | tcgacgagac | acaccgcctg | 360 |
| cacgactggc | tgctctccgt | ctcccgccgc | accccgttcc | tcgtcgccgt | cgacgacctg | 420 |
| acccacgccc | acaccgcgtc | cctgaggttc | ctcctgtact | gcgccgccc | ccacgaccag | 480 |
| ggcggcatcg | gcttcgcat | gaccgagcgy | gcctcgcagc | gcgccggata | ccgggtgttc | 540 |
| cgcgccgagc | tgctccgcca | gccgcactgc | cgcaacatgt | ggctctccgy | gcttcccccc | 600 |
| agcgggggtac | gccagttact | cgcccactac | tacggccccg | aggccgccga | gcggcgggcc | 660 |
| cccgcgtacc | acgcgacgac | cggcgggaaac | ccgctgctcc | tgccggcgct | gaccaggac | 720 |
| cggcaggcct | cccacaccac | cctcggcgcy | gccggcggy | acgagcccgt | ccacggcgac | 780 |
| gccttcgccc | aggccgtcct | cgactgcctg | caccgcagcy | ccgagggcac | actggagacc | 840 |
| gcccgcgtggc | tcgcggtcct | cgaacagtcc | gacccgctcc | tggtggagcy | gctcacggga | 900 |
| acgaccgccc | ccgcgctcga | gcgccacatc | caggagctcy | ccgccatcgy | cctcctggac | 960 |
| gaggacggca | ccctgggaca | gcccgcgac | cgcgaggccg | ccctccagga | cctgccggcc | 1020 |
| ggcgagcgca | ccgaactgca | ccggcgcgcc | gcggagcagc | tgaccggga | cggcgccgac | 1080 |
| gaggacaccg | tgccccgcca | cctgctggtc | ggcgcgcccc | ccgacgctcc | ctggcgctg | 1140 |
| cccctgctcg | aacggggcgc | gcagcaggcc | ctgttcgacg | accgactcga | cgacgccttc | 1200 |
| cggatcctcg | agttcgccgt | gcggtcgagc | accgacaaca | cccagctggc | ccgcctcgcc | 1260 |
| ccacacctgg | tcgcggcctc | ctggcgcatg | aaccgcgaca | tgacgaccgc | ggccctcgca | 1320 |
| ctcttcgacc | gggtcctgag | cgggtgaactg | ccgcccagcc | acccggtcat | ggccctgatc | 1380 |
| cgctgcctcg | tctggtacgy | gcggctgccc | gagggcgccg | acgcgctgtc | ccggctcggy | 1440 |
| cccagctccg | acaacgatgc | cttgagctg | tcgctcacc | ggatgtggct | cgcgcgctg | 1500 |
| tgcccgccgc | tcctggagtc | cctgccggcc | acgccggagc | cggagcgggg | tcctgtcccc | 1560 |
| gtacggctcg | cgccgcggac | gaccgcgtc | caggcccagg | ccggcgctct | ccagcggggc | 1620 |
| ccggacaacg | cctcggtcgc | gcaggccgaa | cagatcctgc | agggctgccc | gctgtcggag | 1680 |
| gagacgtacg | aggccctgga | gacggccctc | ttggctcctg | tccacgccga | ccggctcgac | 1740 |
| cgggcgctgt | tctggtcgga | cgccctgctc | gccgaggccg | tggagcgggc | gtcgctcggc | 1800 |
| tgggaggcgy | tcttcgccgc | gacccgggcg | atgatcgca | tccgctgcy | cgacctccc | 1860 |
| acggcgcggy | agcgggcca | gctggcgctc | tcccacgcgy | cgccggagag | ctggggcctc | 1920 |
| gccgtgggca | tgcccctctc | cgcgctgctg | ctcgctgca | cggaggccgy | cgagtacgaa | 1980 |
| caggcgagc | gggtcctgcy | gcagccggtg | ccggacgcga | tgctcgactc | gcggcacggc | 2040 |
| atggagtaca | tgacgccccg | gggcccgtac | tggtggcgca | cgggccggct | gcacgcggcg | 2100 |
| ctgggagagt | tcatgctctg | cggggagatc | ctgggcagct | ggaacctcga | ccagccctcg | 2160 |
| atcgtgccct | ggcgacctc | cgccgccgag | gtgtacctgc | ggctcgga | ccgccagaag | 2220 |
| gccagggcgc | tgcccgaggc | ccagctcgcc | ctggtgcggc | ccggcgctc | ccgcacccgy | 2280 |
| ggtctcacc | tgccggctcct | ggcgcgggcy | gtggacggcc | agcaggcgga | gcggctgcac | 2340 |
| gccgaggcgy | tcgacatgct | gcacgacagc | ggcgaccgcy | tcgaacacgc | ccgcgcgctc | 2400 |
| gcccggatga | cccggcca | gcaggcccag | ggggacaact | accggcgag | gatgacggcy | 2460 |
| cggctcgccg | gcgacatggc | gtgggcctgc | ggcgctacc | cgctggccga | ggagatcgty | 2520 |
| ccggggccgcy | gcggcccgcy | ggcgaaggcy | gtgagcacgy | agctggaact | gccgggcggc | 2580 |
| ccggacgtcg | gcctgctctc | ggaggccgaa | cgccgggtgg | cgccctggc | agcccaggga | 2640 |
| ttgacgaacc | gccagatagc | gcgcgggtc | tgctcaccg | cgagcacggt | cgaacagcac | 2700 |
| ctgacgcgcy | tctaccgcaa | actgaacgtg | acccgccgag | cagacctccc | gatcagcctc | 2760 |
| gcccaggaca | agtccgtcac | ggcctga | | | | 2787 |

<210> 41

<211> 928

<212> PRT

<213> Streptomyces venezuelae

<400> 41

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Asn | Leu | Val | Glu | Arg | Asp | Gly | Glu | Ile | Ala | His | Leu | Arg | Ala | Val |
| 1 | | | 5 | | | | | 10 | | | | | 15 | | |
| Leu | Asp | Ala | Ser | Ala | Ala | Gly | Asp | Gly | Thr | Leu | Leu | Leu | Val | Ser | Gly |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Pro | Ala | Gly | Ser | Gly | Lys | Thr | Glu | Leu | Leu | Arg | Ser | Leu | Arg | Arg | Leu |
| | | | 35 | | | | 40 | | | | | 45 | | | |
| Ala | Ala | Glu | Arg | Glu | Thr | Pro | Val | Trp | Ser | Val | Arg | Ala | Leu | Pro | Gly |
| | | | 50 | | | | 55 | | | | 60 | | | | |
| Asp | Arg | Asp | Ile | Pro | Leu | Gly | Val | Leu | Cys | Gln | Leu | Leu | Arg | Ser | Ala |
| 65 | | | | 70 | | | | | 75 | | | | | 80 | |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Gln | His | Gly | Ala | Asp | Thr | Ser | Ala | Val | Arg | Asp | Leu | Leu | Asp | Ala | 85 | 90 | 95 |
| Ala | Ser | Arg | Arg | Ala | Gly | Asn | Leu | Thr | Ser | Pro | Ala | Asp | Ala | Pro | Leu | 100 | 105 | 110 |
| Arg | Val | Asp | Glu | Thr | His | Arg | Leu | His | Asp | Trp | Leu | Leu | Ser | Val | Ser | 115 | 120 | 125 |
| Arg | Arg | Thr | Pro | Phe | Leu | Val | Ala | Val | Asp | Asp | Leu | Thr | His | Ala | Asp | 130 | 135 | 140 |
| Thr | Ala | Ser | Leu | Arg | Phe | Leu | Leu | Tyr | Cys | Ala | Ala | His | His | Asp | Gln | 145 | 150 | 155 |
| Gly | Gly | Ile | Gly | Phe | Val | Met | Thr | Glu | Arg | Ala | Ser | Gln | Arg | Ala | Gly | 165 | 170 | 175 |
| Tyr | Arg | Val | Phe | Arg | Ala | Glu | Leu | Leu | Arg | Gln | Pro | His | Cys | Arg | Asn | 180 | 185 | 190 |
| Met | Trp | Leu | Ser | Gly | Leu | Pro | Pro | Ser | Gly | Val | Arg | Gln | Leu | Leu | Ala | 195 | 200 | 205 |
| His | Tyr | Tyr | Gly | Pro | Glu | Ala | Ala | Glu | Arg | Arg | Ala | Pro | Ala | Tyr | His | 210 | 215 | 220 |
| Ala | Thr | Thr | Gly | Gly | Asn | Pro | Leu | Leu | Leu | Arg | Ala | Leu | Thr | Gln | Asp | 225 | 230 | 235 |
| Arg | Gln | Ala | Ser | His | Thr | Thr | Leu | Gly | Ala | Ala | Gly | Gly | Asp | Glu | Pro | 245 | 250 | 255 |
| Val | His | Gly | Asp | Ala | Phe | Ala | Gln | Ala | Val | Leu | Asp | Cys | Leu | His | Arg | 260 | 265 | 270 |
| Ser | Ala | Glu | Gly | Thr | Leu | Glu | Thr | Ala | Arg | Trp | Leu | Ala | Val | Leu | Glu | 275 | 280 | 285 |
| Gln | Ser | Asp | Pro | Leu | Leu | Val | Glu | Arg | Leu | Thr | Gly | Thr | Thr | Ala | Ala | 290 | 295 | 300 |
| Ala | Val | Glu | Arg | His | Ile | Gln | Glu | Leu | Ala | Ala | Ile | Gly | Leu | Leu | Asp | 305 | 310 | 315 |
| Glu | Asp | Gly | Thr | Leu | Gly | Gln | Pro | Ala | Ile | Arg | Glu | Ala | Ala | Leu | Gln | 325 | 330 | 335 |
| Asp | Leu | Pro | Ala | Gly | Glu | Arg | Thr | Glu | Leu | His | Arg | Arg | Ala | Ala | Glu | 340 | 345 | 350 |
| Gln | Leu | His | Arg | Asp | Gly | Ala | Asp | Glu | Asp | Thr | Val | Ala | Arg | His | Leu | 355 | 360 | 365 |
| Leu | Val | Gly | Gly | Ala | Pro | Asp | Ala | Pro | Trp | Ala | Leu | Pro | Leu | Leu | Glu | 370 | 375 | 380 |
| Arg | Gly | Ala | Gln | Gln | Ala | Leu | Phe | Asp | Asp | Arg | Leu | Asp | Asp | Ala | Phe | 385 | 390 | 395 |
| Arg | Ile | Leu | Glu | Phe | Ala | Val | Arg | Ser | Ser | Thr | Asp | Asn | Thr | Gln | Leu | 405 | 410 | 415 |
| Ala | Arg | Leu | Ala | Pro | His | Leu | Val | Ala | Ala | Ser | Trp | Arg | Met | Asn | Pro | 420 | 425 | 430 |
| His | Met | Thr | Thr | Arg | Ala | Leu | Ala | Leu | Phe | Asp | Arg | Leu | Leu | Ser | Gly | 435 | 440 | 445 |
| Glu | Leu | Pro | Pro | Ser | His | Pro | Val | Met | Ala | Leu | Ile | Arg | Cys | Leu | Val | 450 | 455 | 460 |
| Trp | Tyr | Gly | Arg | Leu | Pro | Glu | Ala | Ala | Asp | Ala | Leu | Ser | Arg | Leu | Arg | 465 | 470 | 475 |
| Pro | Ser | Ser | Asp | Asn | Asp | Ala | Leu | Glu | Leu | Ser | Leu | Thr | Arg | Met | Trp | 485 | 490 | 495 |
| Leu | Ala | Ala | Leu | Cys | Pro | Pro | Leu | Leu | Glu | Ser | Leu | Pro | Ala | Thr | Pro | 500 | 505 | 510 |
| Glu | Pro | Glu | Arg | Gly | Pro | Val | Pro | Val | Arg | Leu | Ala | Pro | Arg | Thr | Thr | 515 | 520 | 525 |
| Ala | Leu | Gln | Ala | Gln | Ala | Gly | Val | Phe | Gln | Arg | Gly | Pro | Asp | Asn | Ala | 530 | 535 | 540 |
| Ser | Val | Ala | Gln | Ala | Glu | Gln | Ile | Leu | Gln | Gly | Cys | Arg | Leu | Ser | Glu | 545 | 550 | 555 |
| Glu | Thr | Tyr | Glu | Ala | Leu | Glu | Thr | Ala | Leu | Leu | Val | Leu | Val | His | Ala | 565 | 570 | 575 |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Arg | Leu | Asp | Arg | Ala | Leu | Phe | Trp | Ser | Asp | Ala | Leu | Leu | Ala | Glu |
| | | | 580 | | | | | 585 | | | | | 590 | | |
| Ala | Val | Glu | Arg | Arg | Ser | Leu | Gly | Trp | Glu | Ala | Val | Phe | Ala | Ala | Thr |
| | | 595 | | | | | 600 | | | | | 605 | | | |
| Arg | Ala | Met | Ile | Ala | Ile | Arg | Cys | Gly | Asp | Leu | Pro | Thr | Ala | Arg | Glu |
| | 610 | | | | | 615 | | | | | 620 | | | | |
| Arg | Ala | Glu | Leu | Ala | Leu | Ser | His | Ala | Ala | Pro | Glu | Ser | Trp | Gly | Leu |
| | 625 | | | | 630 | | | | | 635 | | | | | 640 |
| Ala | Val | Gly | Met | Pro | Leu | Ser | Ala | Leu | Leu | Leu | Ala | Cys | Thr | Glu | Ala |
| | | | 645 | | | | | 650 | | | | | | 655 | |
| Gly | Glu | Tyr | Glu | Gln | Ala | Glu | Arg | Val | Leu | Arg | Gln | Pro | Val | Pro | Asp |
| | | 660 | | | | | | 665 | | | | | 670 | | |
| Ala | Met | Phe | Asp | Ser | Arg | His | Gly | Met | Glu | Tyr | Met | His | Ala | Arg | Gly |
| | 675 | | | | | | 680 | | | | | 685 | | | |
| Arg | Tyr | Trp | Leu | Ala | Thr | Gly | Arg | Leu | His | Ala | Ala | Leu | Gly | Glu | Phe |
| | 690 | | | | | 695 | | | | | 700 | | | | |
| Met | Leu | Cys | Gly | Glu | Ile | Leu | Gly | Ser | Trp | Asn | Leu | Asp | Gln | Pro | Ser |
| | 705 | | | | 710 | | | | | 715 | | | | | 720 |
| Ile | Val | Pro | Trp | Arg | Thr | Ser | Ala | Ala | Glu | Val | Tyr | Leu | Arg | Leu | Gly |
| | | | 725 | | | | | | 730 | | | | | 735 | |
| Asn | Arg | Gln | Lys | Ala | Arg | Ala | Leu | Ala | Glu | Ala | Gln | Leu | Ala | Leu | Val |
| | | | 740 | | | | | 745 | | | | | 750 | | |
| Arg | Pro | Gly | Arg | Ser | Arg | Thr | Arg | Gly | Leu | Thr | Leu | Arg | Val | Leu | Ala |
| | | 755 | | | | | 760 | | | | | 765 | | | |
| Ala | Ala | Val | Asp | Gly | Gln | Gln | Ala | Glu | Arg | Leu | His | Ala | Glu | Ala | Val |
| | 770 | | | | | 775 | | | | | 780 | | | | |
| Asp | Met | Leu | His | Asp | Ser | Gly | Asp | Arg | Leu | Glu | His | Ala | Arg | Ala | Leu |
| | 785 | | | | 790 | | | | | 795 | | | | | 800 |
| Ala | Gly | Met | Ser | Arg | His | Gln | Gln | Ala | Gln | Gly | Asp | Asn | Tyr | Arg | Ala |
| | | | 805 | | | | | | 810 | | | | | 815 | |
| Arg | Met | Thr | Ala | Arg | Leu | Ala | Gly | Asp | Met | Ala | Trp | Ala | Cys | Gly | Ala |
| | | 820 | | | | | | 825 | | | | | 830 | | |
| Tyr | Pro | Leu | Ala | Glu | Glu | Ile | Val | Pro | Gly | Arg | Gly | Gly | Arg | Arg | Ala |
| | | 835 | | | | | 840 | | | | | 845 | | | |
| Lys | Ala | Val | Ser | Thr | Glu | Leu | Glu | Leu | Pro | Gly | Gly | Pro | Asp | Val | Gly |
| | 850 | | | | | 855 | | | | | 860 | | | | |
| Leu | Leu | Ser | Glu | Ala | Glu | Arg | Arg | Val | Ala | Ala | Leu | Ala | Ala | Arg | Gly |
| | 865 | | | | 870 | | | | | 875 | | | | | 880 |
| Leu | Thr | Asn | Arg | Gln | Ile | Ala | Arg | Arg | Leu | Cys | Val | Thr | Ala | Ser | Thr |
| | | | 885 | | | | | 890 | | | | | | 895 | |
| Val | Glu | Gln | His | Leu | Thr | Arg | Val | Tyr | Arg | Lys | Leu | Asn | Val | Thr | Arg |
| | | 900 | | | | | | 905 | | | | | 910 | | |
| Arg | Ala | Asp | Leu | Pro | Ile | Ser | Leu | Ala | Gln | Asp | Lys | Ser | Val | Thr | Ala |
| | | 915 | | | | | 920 | | | | | | 925 | | |

<210> 42
 <211> 27
 <212> DNA
 <213> Streptomyces venezuelae

<400> 42
 cccgaattcg ccgcccgcatt ggccgaa

27

<210> 43
 <211> 35
 <212> DNA
 <213> Streptomyces venezuelae

<400> 43
 gtgatgcattc ggctcggcga cggcccagtt ccgct

35

<210> 44
 <211> 45
 <212> DNA
 <213> Streptomyces venezuelae

 <400> 44
 atgcatcacc accaccacca ctgagggggc gggcaagtga ccgac 45

 <210> 45
 <211> 33
 <212> DNA
 <213> Streptomyces venezuelae

 <400> 45
 gggctctagag ctgcaccggc gggctcgtagc gga 33

 <210> 46
 <211> 27
 <212> DNA
 <213> Streptomyces venezuelae

 <400> 46
 gaattcatcg agggggcgagg caagtga 27

 <210> 47
 <211> 31
 <212> DNA
 <213> Streptomyces venezuelae

 <400> 47
 atgcatcagg tcgtcgggtca ccgtgggttc t 31

 <210> 48
 <211> 30
 <212> DNA
 <213> Streptomyces venezuelae

 <400> 48
 ggatccgcgc cgggatgttc cgcgccctgt 30

 <210> 49
 <211> 31
 <212> DNA
 <213> Streptomyces venezuelae

 <400> 49
 aaaatgcatc agaggtctgt cggtcacttg c 31

 <210> 50
 <211> 41
 <212> DNA
 <213> Streptomyces venezuelae

 <400> 50
 aaaagatctt gatgggtgcag gcgctgcgcc acgggggtgct g 41

 <210> 51
 <211> 32
 <212> DNA
 <213> Streptomyces venezuelae

<400> 51
 aaaagatctc caacgaacag ttggtggacg ct

32

<210> 52
 <211> 846
 <212> DNA
 <213> Streptomyces venezuelae

<400> 52
 gtgaccgaca gacctctgaa cgtggacagc ggactgtgga tccggcgctt ccaccccgcg 60
 ccgaacagcg cgggtgcggct ggtctgcttg ccgcacgccc gcggctccgc cagctacttc 120
 ttccgcttct cggaggagct gcacccctcc gtcgaggccc tgtcggtgca gtatccgggc 180
 cgccaggacc ggcgtgccga gccgtgtctg gagagcgtcg aggagctcgc cgagcatgtg 240
 gtcgcggcca ccgaaccctg gtggcaggag ggccggctgg ccttcttcgg gcacagcctc 300
 ggcgcctccg tcgccttcga gacggcccgc atcctggaac agcggcacgg ggtacggccc 360
 gagggcctgt acgtctccgg tcggcgcgcc ccgtcgttgg cgccggaccg gctcgtccac 420
 cagctggacg accgggctgt cctggccgag atccggcggc tcagcggcac cgacgagcgg 480
 ttcctccagg acgacgagct gctgcggctg gtgctgcccg cgctgcgcag cgactacaag 540
 gcggcgaggaga cgtacctgca ccggccgctc gccaaagtca cctgcccggg gatggccctg 600
 gccggcgacc gtgaccgaa ggcggcgctg aacgaggtgg ccgagtggcg tcggcacacc 660
 agcgggcccgt tctgcctccg ggcgtactcc ggcgccact tctacctcaa cgaccagtgg 720
 cacgagatct gcaacgacat ctccgaccac ctgctcgtca cccgcggcgc gcccgatgcc 780
 cgcgtcgtgc agccccgcac cagccttacc gaaggagcgg cgaagagatg gcagaaccac 840
 cggatga 846

<210> 53
 <211> 281
 <212> PRT
 <213> Streptomyces venezuelae

<400> 53
 Met Thr Asp Arg Pro Leu Asn Val Asp Ser Gly Leu Trp Ile Arg Arg
 1 5 10 15
 Phe His Pro Ala Pro Asn Ser Ala Val Arg Leu Val Cys Leu Pro His
 20 25 30
 Ala Gly Gly Ser Ala Ser Tyr Phe Phe Arg Phe Ser Glu Glu Leu His
 35 40 45
 Pro Ser Val Glu Ala Leu Ser Val Gln Tyr Pro Gly Arg Gln Asp Arg
 50 55 60
 Arg Ala Glu Pro Cys Leu Glu Ser Val Glu Glu Leu Ala Glu His Val
 65 70 75 80
 Val Ala Ala Thr Glu Pro Trp Trp Gln Glu Gly Arg Leu Ala Phe Phe
 85 90 95
 Gly His Ser Leu Gly Ala Ser Val Ala Phe Glu Thr Ala Arg Ile Leu
 100 105 110
 Glu Gln Arg His Gly Val Arg Pro Glu Gly Leu Tyr Val Ser Gly Arg
 115 120 125
 Arg Ala Pro Ser Leu Ala Pro Asp Arg Leu Val His Gln Leu Asp Asp
 130 135 140
 Arg Ala Phe Leu Ala Glu Ile Arg Arg Leu Ser Gly Thr Asp Glu Arg
 145 150 155 160
 Phe Leu Gln Asp Asp Glu Leu Leu Arg Leu Val Leu Pro Ala Leu Arg
 165 170 175
 Ser Asp Tyr Lys Ala Ala Glu Thr Tyr Leu His Arg Pro Ser Ala Lys
 180 185 190
 Leu Thr Cys Pro Val Met Ala Leu Ala Gly Asp Arg Asp Pro Lys Ala
 195 200 205
 Pro Leu Asn Glu Val Ala Glu Trp Arg Arg His Thr Ser Gly Pro Phe
 210 215 220
 Cys Leu Arg Ala Tyr Ser Gly Gly His Phe Tyr Leu Asn Asp Gln Trp
 225 230 235 240

His Glu Ile Cys Asn Asp Ile Ser Asp His Leu Leu Val Thr Arg Gly
245 250 255
Ala Pro Asp Ala Arg Val Val Gln Pro Pro Thr Ser Leu Ile Glu Gly
260 265 270
Ala Ala Lys Arg Trp Gln Asn Pro Arg
275 280

<210> 54
<211> 404
<212> DNA
<213> Streptomyces venezuelae

<400> 54
tggccgaagt gccctcgac cggctgcggg acgccgggggt cctcgacacc gtcctgcggc 60
tcaccggaat cgagcccag cgggtgtccg gcggcccggc cgacggcgcc gcggaccccg 120
gtgcggagcc ggagccggag acgtcgatcg acgacctga cgccgaggcc ctgatccgga 180
tggctctcgg cccgcggaac acctgacctg accgcggcca cggcccgcac accgccaggt 240
gccgtcaggc accaccgcga cccctgcccc ccacacgccc acaaccccat ccacgagcgg 300
aagaccacac ccagatgacg agttccaacg agcagttggt ggacgctctg cgcgcctccc 360
tcaaggagaa cgaagaatc cggaaagaga gccgtcgccg ggac 404

<210> 55
<211> 437
<212> DNA
<213> Streptomyces narbonensis

<400> 55
tggccgaact gccctcgac cggctgcggg acgccgggggt cctcgacacc gtcctgcgac 60
tcaccggcat cgagcccag cgggtgcccg gcggcccggg cagcgtcgcc gccggccccg 120
ccgcggatcc ggaaccggag acgtcgatcg acgacctga cgccgaggcc ctgatccgga 180
tggctctcgg cccgcggaac gcctgagcac ccgcccggc cgtgggctgc cccggccctt 240
gcccgactgc gggccggggc cggggcccgc acaccgccac gtaccacccc gcaccaccgc 300
ccccacacg cccacaacgc catccacgag cggaagacca caccagatg acgagttcca 360
acgagcagtt ggtggacgct ctgcgcgcct ccctcaagga gaacgaagaa ctccggaag 420
agagccgtcg ccgggac 437

<210> 56
<211> 327
<212> DNA
<213> Streptomyces venezuelae

<400> 56
tcgacggcat cgagcgggac accgccgcgg accggcggac cgcgcagggg gcgaaccagt 60
gaccgacagc gttctgaacg tggacggcaa cctgtggatc cggcgcttcc atccctcgcc 120
gaacagcgcg gtgcgactgg tctgcctgcc ccatgccggc ggctccgcca gctacttctt 180
ccgcttctcg gaggagctcc acccctcggt cgaggcctg tcggtgcagt acccgggccg 240
ccaggaccgg cgtgccgagc cgtgcctgga gagcgtcgag gagctggccg agcacgtggt 300
cgcggccacc gaaccctggt ggcagga 327

<210> 57
<211> 327
<212> DNA
<213> Streptomyces narbonensis

<400> 57
tcgacggcat cgagcgggac accgccgcgg ggcggcggac cgcgcagggg gcggaccagt 60
gaccgacaga gttctgaacg tggacagcag cctgtggatc cgacgcttcc acccctcgcc 120
gaacagcgcg gtgcggctgg tctgtctgcc gcacgccggg ggttccgcca gctacttctt 180
ccgcttctcg gaggagctcc acccctcggt cgaggcctg tcggtgcagt acccgggccg 240
ccaggaccgg cgtgccgagc cgtgtctgga gaacgtcgag gagctcgccg agcacgtggt 300
cgcggccacc gaagcctggt ggcggga 327

<210> 58
 <211> 25
 <212> PRT
 <213> A. eutrophus

 <400> 58
 Met Ala Thr Gly Lys Gly Ala Ala Ala Ser Thr Gln Glu Gly Lys Ser
 1 5 10 15
 Gln Pro Phe Lys Val Thr Pro Gly Pro
 20 25

 <210> 59
 <211> 19
 <212> PRT
 <213> A. eutrophus

 <400> 59
 Ala Ala Ala Ser Thr Gln Glu Gly Lys Ser Gln Pro Phe Lys Val Thr
 1 5 10 15
 Pro Gly Pro

 <210> 60
 <211> 16
 <212> PRT
 <213> A. eutrophus

 <400> 60
 Ser Thr Gln Glu Gly Lys Ser Gln Pro Phe Lys Val Thr Pro Gly Pro
 1 5 10 15

 <210> 61
 <211> 585
 <212> PRT
 <213> Streptomyces venezuelae

 <400> 61
 Met Ile Leu Arg Ala Gly Thr Ala Asp Pro Ala Pro Tyr Glu Glu Glu
 1 5 10 15
 Ile Pro Gly Tyr Arg Ala Arg Ile Leu Asn Met Ser Asn Lys Asn Asn
 20 25 30
 Asp Glu Leu Gln Arg Gln Ala Ser Glu Asn Thr Leu Gly Leu Asn Pro
 35 40 45
 Val Ile Gly Ile Arg Arg Lys Asp Leu Leu Ser Ser Ala Arg Thr Val
 50 55 60
 Leu Arg Gln Ala Val Arg Gln Pro Leu His Ser Ala Lys His Val Ala
 65 70 75 80
 His Phe Gly Leu Glu Leu Lys Asn Val Leu Leu Gly Lys Ser Ser Leu
 85 90 95
 Ala Pro Glu Ser Asp Asp Arg Arg Phe Asn Asp Pro Ala Trp Ser Asn
 100 105 110
 Asn Pro Leu Tyr Arg Arg Tyr Leu Gln Thr Tyr Leu Ala Trp Arg Lys
 115 120 125
 Glu Leu Gln Asp Trp Ile Gly Asn Ser Asp Leu Ser Pro Gln Asp Ile
 130 135 140
 Ser Arg Gly Gln Phe Val Ile Asn Leu Met Thr Glu Ala Met Ala Pro
 145 150 155 160
 Thr Asn Thr Leu Ser Asn Pro Ala Ala Val Lys Arg Phe Phe Glu Thr
 165 170 175
 Gly Gly Lys Ser Leu Leu Asp Gly Leu Ser Asn Leu Ala Lys Asp Leu
 180 185 190

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Asn | Asn | Gly | Gly | Met | Pro | Ser | Gln | Val | Asn | Met | Asp | Ala | Phe | Glu |
| | 195 | | | | | | 200 | | | | | 205 | | | |
| Val | Gly | Lys | Asn | Leu | Gly | Thr | Ser | Glu | Gly | Ala | Val | Val | Tyr | Arg | Asn |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Asp | Val | Leu | Glu | Leu | Ile | Gln | Tyr | Lys | Pro | Ile | Thr | Glu | Gln | Val | His |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Ala | Arg | Pro | Leu | Leu | Val | Val | Pro | Pro | Gln | Ile | Asn | Lys | Phe | Tyr | Val |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Phe | Asp | Leu | Ser | Pro | Glu | Lys | Ser | Leu | Ala | Arg | Tyr | Cys | Leu | Arg | Ser |
| | | 260 | | | | | | 265 | | | | | 270 | | |
| Gln | Gln | Gln | Thr | Phe | Ile | Ile | Ser | Trp | Arg | Asn | Pro | Thr | Lys | Ala | Gln |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Arg | Glu | Trp | Gly | Leu | Ser | Thr | Tyr | Ile | Asp | Ala | Leu | Lys | Glu | Ala | Val |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Asp | Ala | Val | Leu | Ala | Ile | Thr | Gly | Ser | Lys | Asp | Leu | Asn | Met | Leu | Gly |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Ala | Cys | Ser | Gly | Gly | Ile | Thr | Cys | Thr | Ala | Leu | Val | Gly | His | Tyr | Ala |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Ala | Leu | Gly | Glu | Asn | Lys | Val | Asn | Ala | Leu | Thr | Leu | Leu | Val | Ser | Val |
| | | 340 | | | | | | 345 | | | | | 350 | | |
| Leu | Asp | Thr | Thr | Met | Asp | Asn | Gln | Val | Ala | Leu | Phe | Val | Asp | Glu | Gln |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Thr | Leu | Glu | Ala | Ala | Lys | Arg | His | Ser | Tyr | Gln | Ala | Gly | Val | Leu | Glu |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| Gly | Ser | Glu | Met | Ala | Lys | Val | Phe | Ala | Trp | Met | Arg | Pro | Asn | Asp | Leu |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Ile | Trp | Asn | Tyr | Trp | Val | Asn | Asn | Tyr | Leu | Leu | Gly | Asn | Glu | Pro | Pro |
| | | | | 405 | | | | | 410 | | | | | 415 | |
| Val | Phe | Asp | Ile | Leu | Phe | Trp | Asn | Asn | Asp | Thr | Thr | Arg | Leu | Pro | Ala |
| | | | 420 | | | | | 425 | | | | | 430 | | |
| Ala | Phe | His | Gly | Asp | Leu | Ile | Glu | Met | Phe | Lys | Ser | Asn | Pro | Leu | Thr |
| | 435 | | | | | | 440 | | | | | 445 | | | |
| Arg | Pro | Asp | Ala | Leu | Glu | Val | Cys | Gly | Thr | Pro | Ile | Asp | Leu | Lys | Gln |
| | 450 | | | | | 455 | | | | | 460 | | | | |
| Val | Lys | Cys | Asp | Ile | Tyr | Ser | Leu | Ala | Gly | Thr | Asn | Asp | His | Ile | Thr |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 |
| Pro | Trp | Gln | Ser | Cys | Tyr | Arg | Ser | Ala | His | Leu | Phe | Gly | Gly | Lys | Ile |
| | | | | 485 | | | | | 490 | | | | | 495 | |
| Glu | Phe | Val | Leu | Ser | Asn | Ser | Gly | His | Ile | Gln | Ser | Ile | Leu | Asn | Pro |
| | | | 500 | | | | | 505 | | | | | 510 | | |
| Pro | Gly | Asn | Pro | Lys | Ala | Arg | Phe | Met | Thr | Gly | Ala | Asp | Arg | Pro | Gly |
| | | 515 | | | | | 520 | | | | | 525 | | | |
| Asp | Pro | Val | Ala | Trp | Gln | Glu | Asn | Ala | Thr | Lys | His | Ala | Asp | Ser | Trp |
| | 530 | | | | | 535 | | | | | 540 | | | | |
| Trp | Leu | His | Trp | Gln | Ser | Trp | Leu | Gly | Glu | Arg | Ala | Gly | Glu | Leu | Glu |
| 545 | | | | | 550 | | | | | 555 | | | | | 560 |
| Lys | Ala | Pro | Thr | Arg | Leu | Gly | Asn | Arg | Ala | Tyr | Ala | Ala | Gly | Glu | Ala |
| | | | | 565 | | | | | 570 | | | | | 575 | |
| Ser | Pro | Gly | Thr | Tyr | Val | His | Glu | Arg | | | | | | | |
| | | | 580 | | | | | 585 | | | | | | | |

<210> 62

<211> 268

<212> PRT

<213> Streptomyces venezuelae

<400> 62

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ile | Arg | Arg | Phe | His | Pro | Ala | Pro | Asn | Ser | Ala | Val | Arg | Leu | Val | Cys |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Leu | Pro | His | Ala | Gly | Gly | Ser | Ala | Ser | Tyr | Phe | Phe | Arg | Phe | Ser | Glu |
| | | | 20 | | | | | 25 | | | | | 30 | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Leu | His | Pro | Ser | Val | Glu | Ala | Leu | Ser | Val | Gln | Tyr | Pro | Gly | Arg |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Gln | Asp | Arg | Arg | Ala | Glu | Pro | Cys | Leu | Glu | Ser | Val | Glu | Glu | Leu | Ala |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Glu | His | Val | Val | Ala | Ala | Thr | Glu | Pro | Trp | Trp | Gln | Glu | Gly | Arg | Leu |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Ala | Phe | Phe | Gly | His | Ser | Leu | Gly | Ala | Ser | Val | Ala | Phe | Glu | Thr | Ala |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Arg | Ile | Leu | Glu | Gln | Arg | His | Gly | Val | Arg | Pro | Glu | Gly | Leu | Tyr | Val |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Ser | Gly | Arg | Arg | Ala | Pro | Ser | Leu | Ala | Pro | Asp | Arg | Leu | Val | His | Gln |
| | 115 | | | | | | 120 | | | | | 125 | | | |
| Leu | Asp | Asp | Arg | Ala | Phe | Leu | Ala | Glu | Ile | Arg | Arg | Leu | Ser | Gly | Thr |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Asp | Glu | Arg | Phe | Leu | Gln | Asp | Asp | Glu | Leu | Leu | Arg | Leu | Val | Leu | Pro |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Ala | Leu | Arg | Ser | Asp | Tyr | Lys | Ala | Ala | Glu | Thr | Tyr | Leu | His | Arg | Pro |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Ser | Ala | Lys | Leu | Thr | Cys | Pro | Val | Met | Ala | Leu | Ala | Gly | Asp | Arg | Asp |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Pro | Lys | Ala | Pro | Leu | Asn | Glu | Val | Ala | Glu | Trp | Arg | Arg | His | Thr | Ser |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Gly | Pro | Phe | Cys | Leu | Arg | Ala | Tyr | Ser | Gly | Gly | His | Phe | Tyr | Leu | Asn |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Asp | Gln | Trp | His | Glu | Ile | Cys | Asn | Asp | Ile | Ser | Asp | His | Leu | Leu | Val |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Thr | Arg | Gly | Ala | Pro | Asp | Ala | Arg | Val | Val | Gln | Pro | Pro | Thr | Ser | Leu |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Ile | Glu | Gly | Ala | Ala | Lys | Arg | Trp | Gln | Asn | Pro | Arg | | | | |
| | | | 260 | | | | | 265 | | | | | | | |